Gallenkamp

17th Edition

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SCIENTIFIC APPARATUS & INSTRUMENTS, LABORATORY FURNITURE & FITTINGS

17th EDITION
GENERAL CATALOGUE

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Areas and telephones, see page 9. OVERSEAS, SEE PAGES 10 & 11

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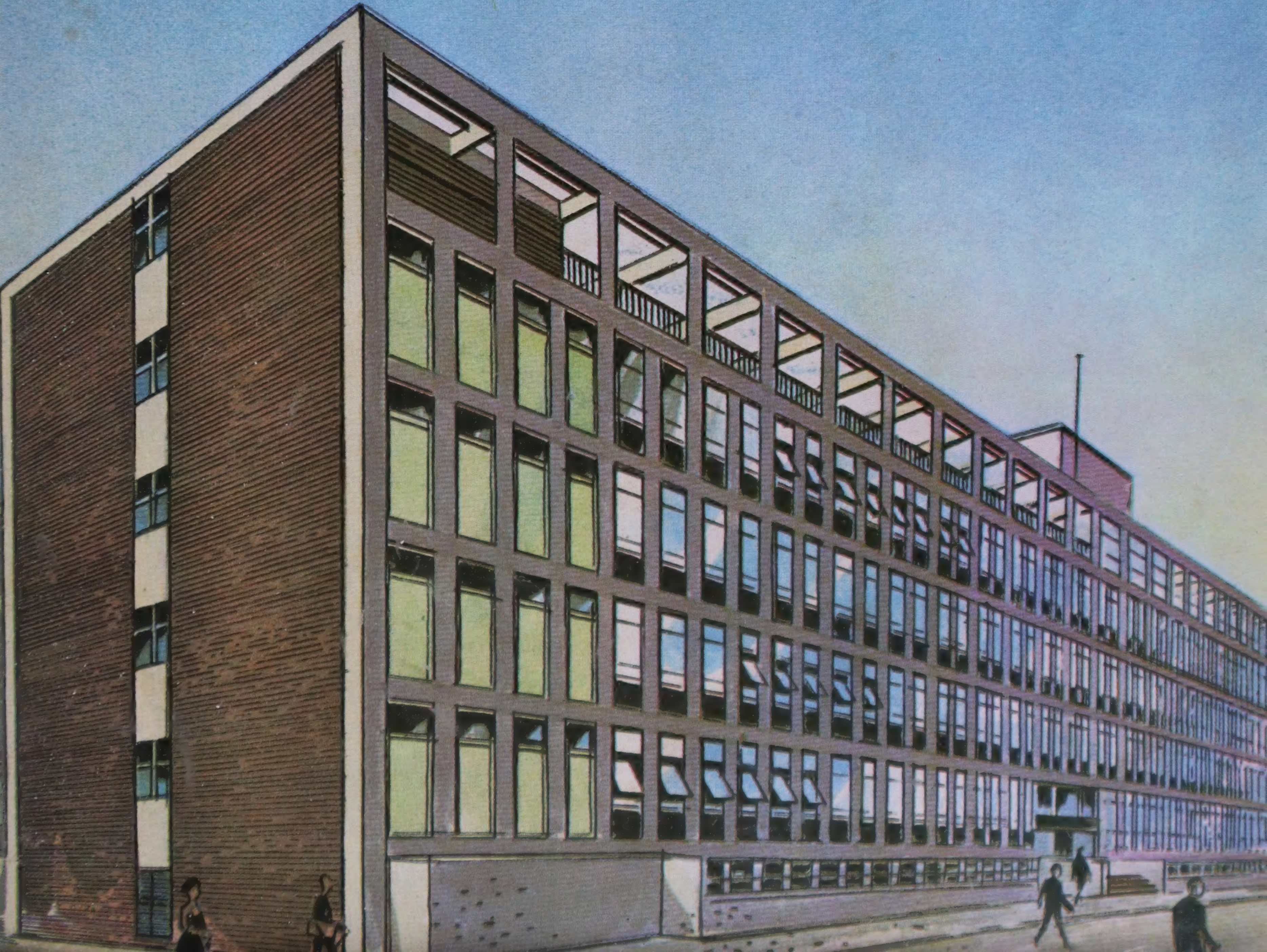

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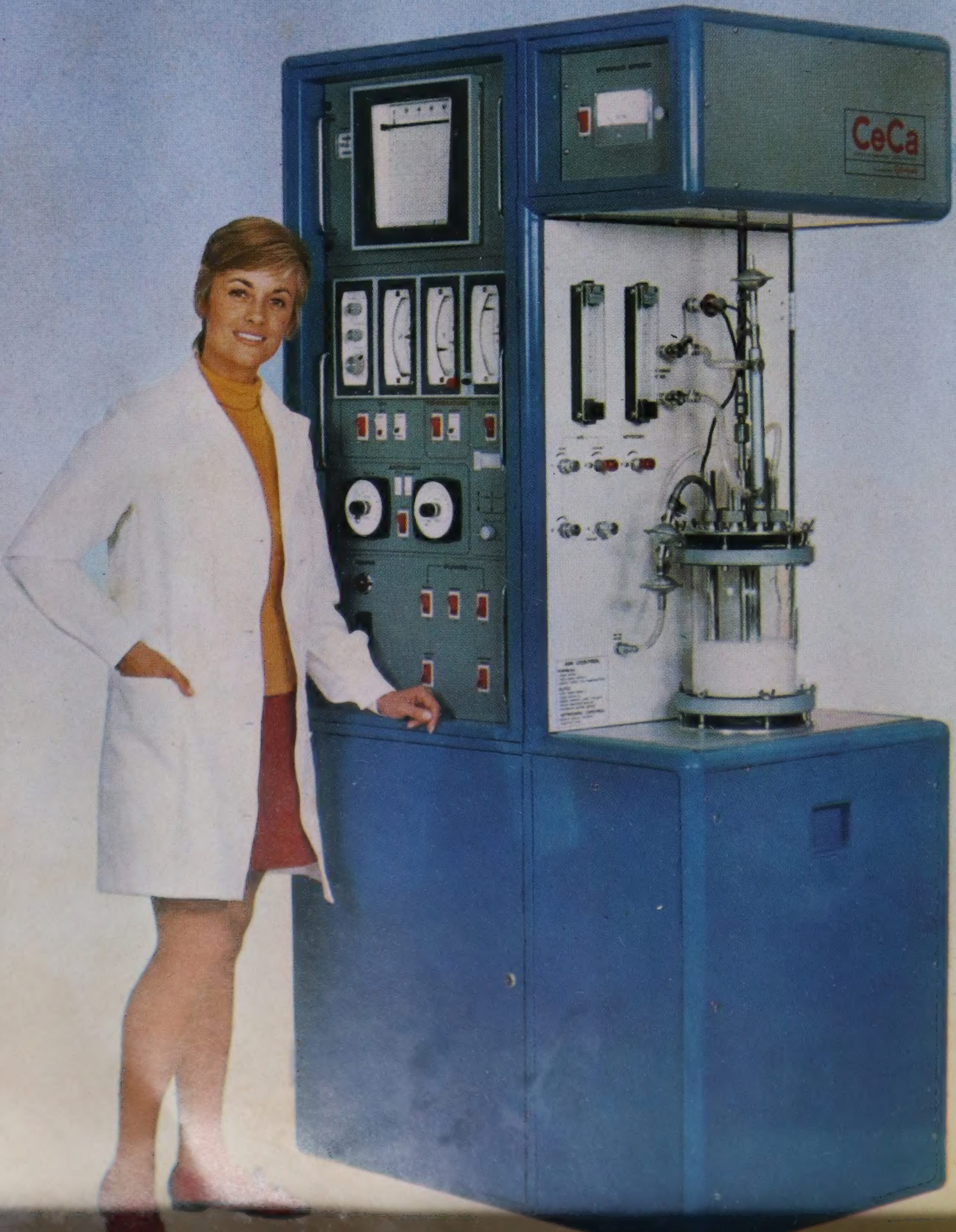

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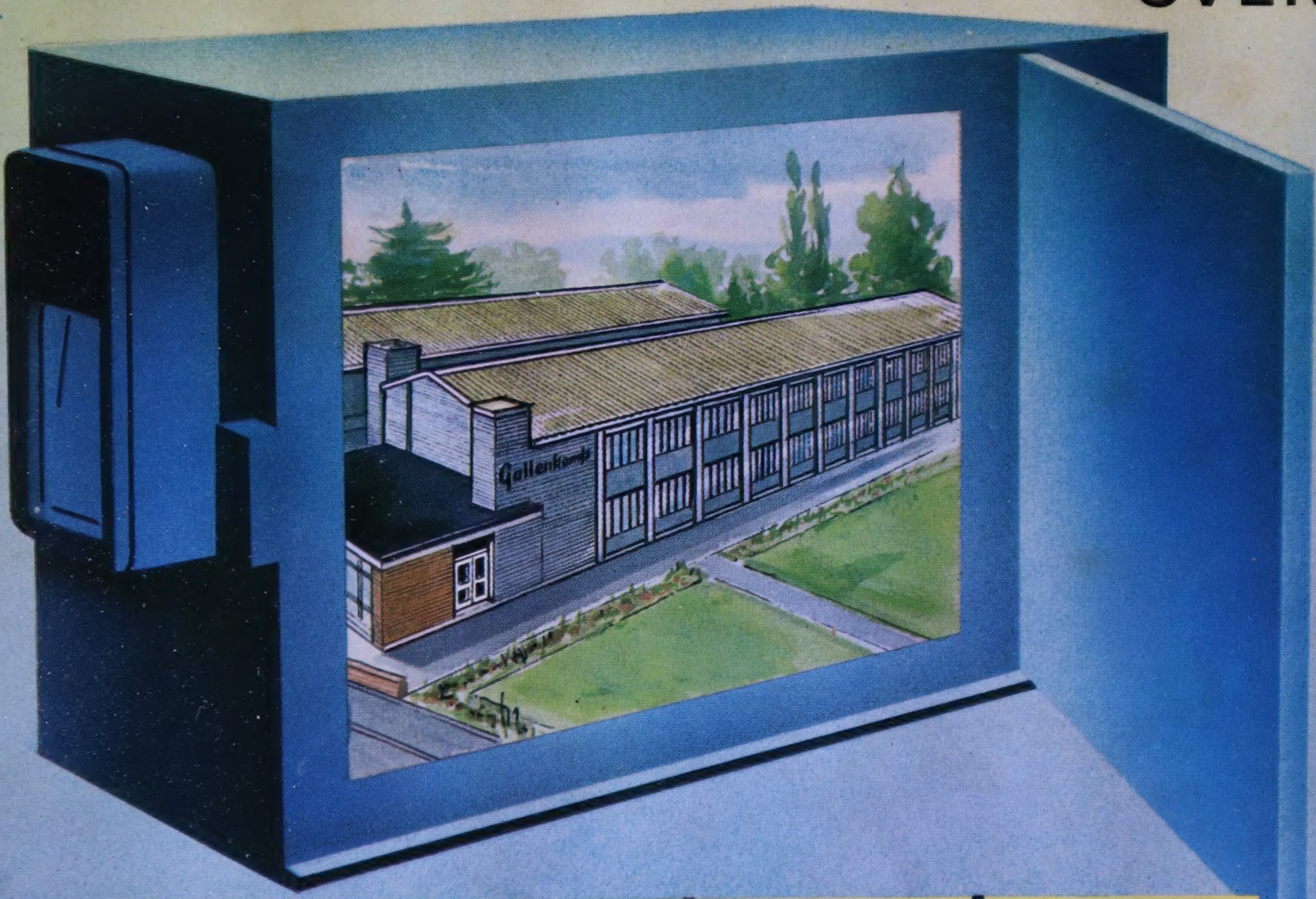
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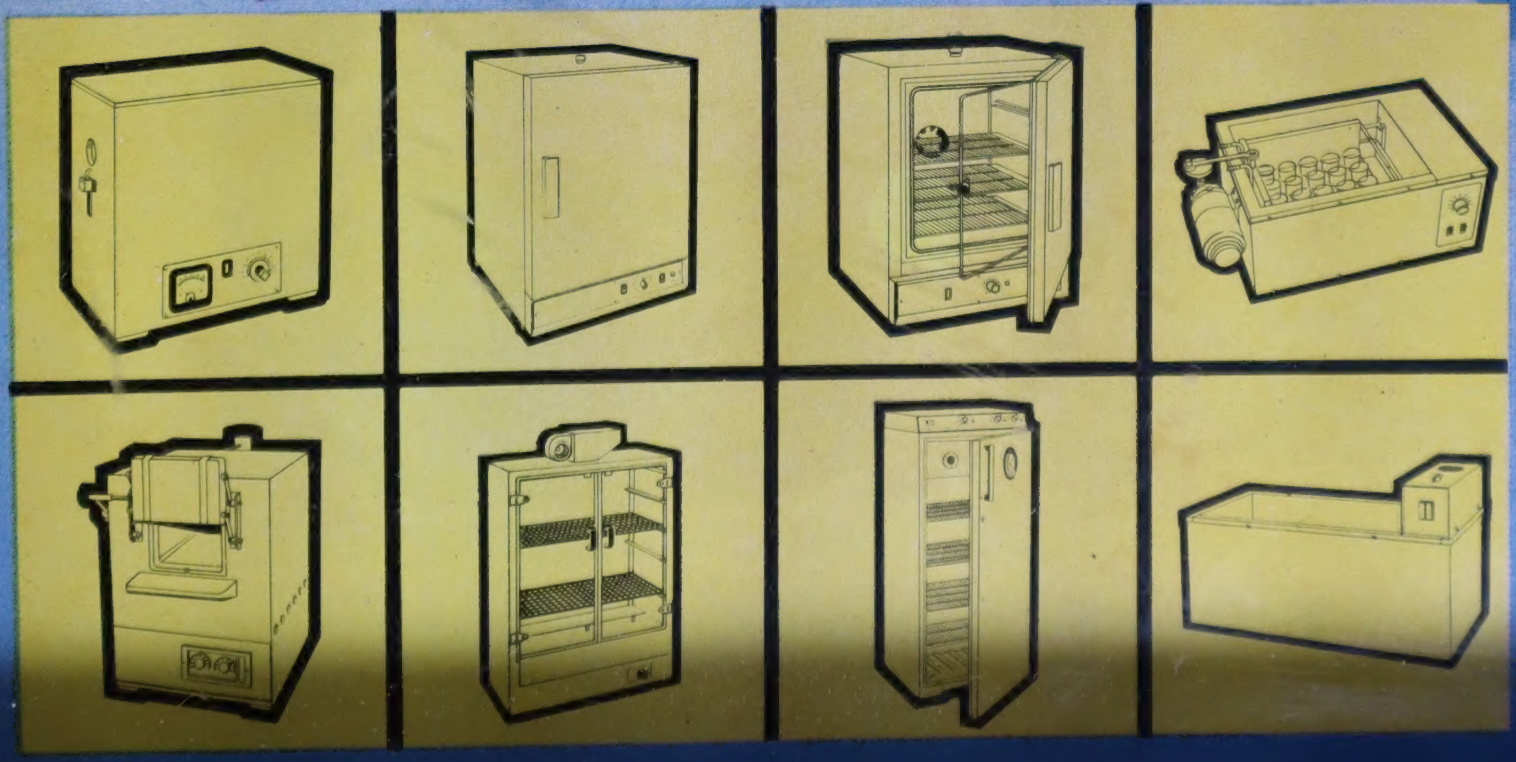

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Gallenkamp 17th EDITION CATALOGUE

INTRODUCTION

This 17th edition of our general catalogue supersedes all previous editions. The presentation and layout, including the catalogue numbering system, remain substantially unchanged, as the pattern set in recent editions has proved to be both popular and convenient.

The following explanatory notes are intended to facilitate easy reference to, and use of, the catalogue.

MAIN AND CROSS-REFERENCE ENTRIES

Every article in the catalogue has one main entry, the position of which determines its list number and under which the full specification and price will be found. Many articles, for various reasons, require entries in several places. In such instances the subsidiary entries show only brief details together with the list number which provides ready reference to the main entry in alphabetical and numerical sequence. This system avoids much unnecessary duplication and minimises the bulk of the catalogue.

An increased number of cross references reminds users of associated apparatus and minimises the need to refer to the index.

The index facilitates the location of obscure items and those having more than one name or description.

PRICES

Prices are in decimal currency which officially comes into effect in the United Kingdom on 15th February 1971.

The £ (sterling) will remain as the largest unit of currency, but shillings ('s') and pence ('d') will be replaced by 'new pence' (p). There will be 100 new pence in each £, and the following summary compares the old currency values with the new.

1/- = £0·05 (five pence)
2/- = £0·10 (ten pence)
5/- = £0·25 (twenty-five pence)
10/- = £0·50 (fifty pence)
15/- = £0·75 (seventy-five pence)
20/- (£1) = £1·00 (hundred pence)

PRICE STRUCTURE

On a number of pages appears an explanatory inset which gives the reasons for our adoption of a pricing system which provides, towards the lower end of the price scale, a progressively greater differential in favour of purchase in larger quantities.

We feel confident that our customers will recognise this to be a fair and equitable basis for minimising the disproportionately higher cost of handling low value and small quantity orders.

ORDERS AND ENQUIRIES

When ordering or making enquiries please give our catalogue numbers and other essential data included in the specification, such as size, colour, details of gas or electricity supply, etc. Catalogue entries clearly indicate available standard voltage ranges of all major electrical instruments and apparatus.

Orders and enquiries which include such information can be processed with less risk of misinterpretation, and with the minimum of delay.

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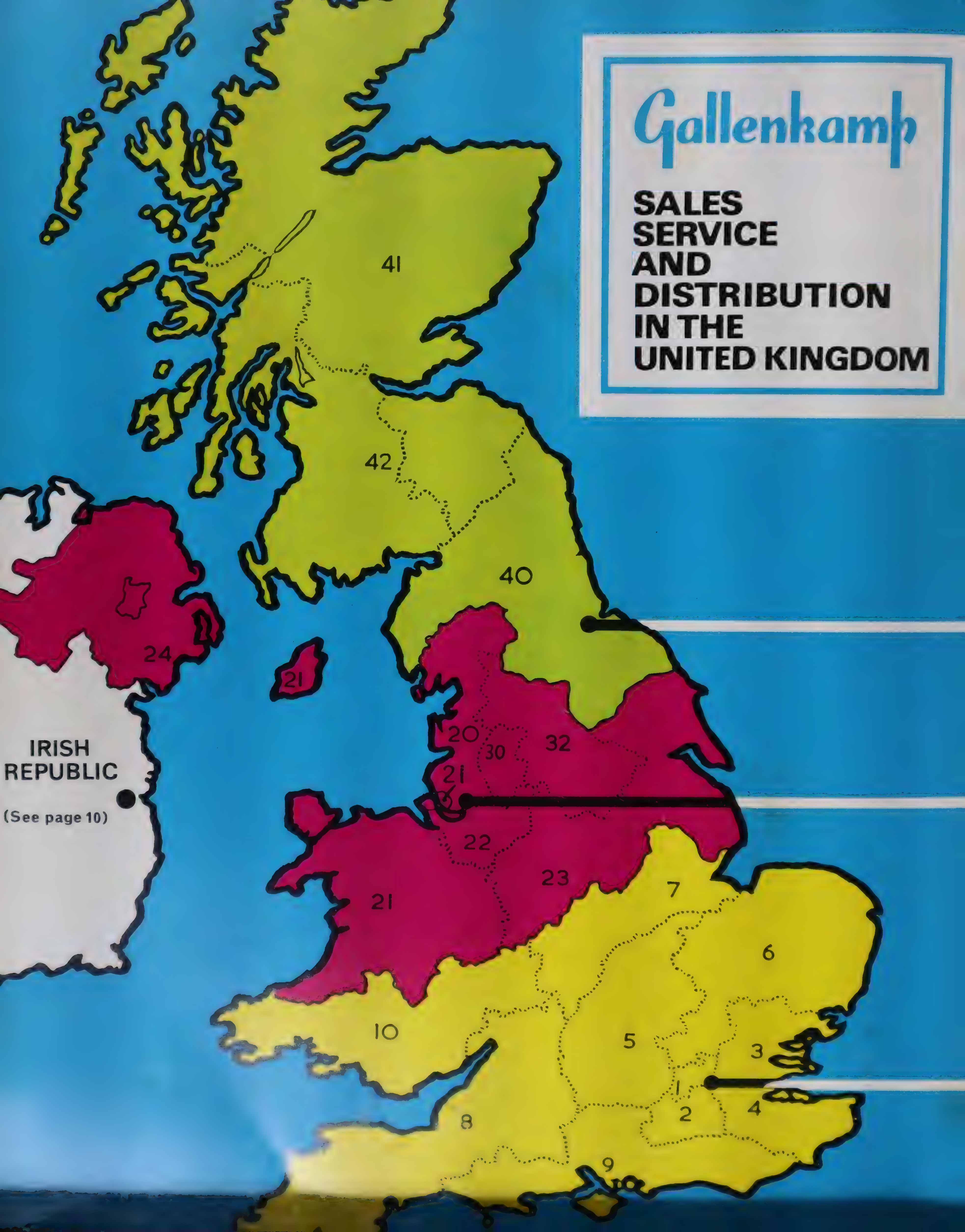
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CONDITIONS OF SALE

All orders are accepted and goods supplied by us on the following terms and conditions:—

SECTION 1.

Applicable to all orders.

1.1. PRICES

All quoted and printed prices are ex works and subject to alteration without notice; we reserve the right to invoice goods at prices ruling at the date of despatch.

1.2. QUANTITY RATES

Many articles are priced with two or more differential rates according to quantity so as to provide a price advantage in favour of the larger quantity. Towards the lower end of the price scale, this differential becomes progressively greater in favour of the larger quantity.

Quantity prices apply only to orders for the specified quantity or more. Pack prices apply only to single or multiple packs. All small or broken pack quantities are charged at the higher rate applicable to small quantities.

Discounts based on 'Order value' or 'Quantity' are available in respect of several groups of goods provided the order complies with certain stated conditions. For details see page 14.

1.3. QUOTATIONS & INVOICES

All quotations are subject to confirmation, and we reserve the right to correct any accidental errors or omissions on quotations or invoices. Where all factors governing the price of the goods are under our direct control we will, unless otherwise stated, hold quoted prices firm if an order is received within 30 days from the date of the quotation.

1.4. DELIVERY

Whilst every effort is made to adhere to delivery dates lateness or failure in delivery shall not entitle the Purchaser to cancel any contract or hold up any payment. We shall not be under any liability for any loss, injury or damage caused by or consequent to any delay in delivery or non-delivery from any cause whatsoever. In particular deliveries offered ex stock are subject to the goods being unsold at the date of receipt of the Purchaser's order.

1.5. WARRANTY & RESPONSIBILITY

Subject to the due observance of any installation, operating or maintenance instructions, we warrant that we will replace or repair at our option free of charge any part or parts of goods of our own manufacture proved to our satisfaction to be defective owing to faults in workmanship or materials. In the case of goods not manufactured by us the Purchaser shall be entitled only to such rights as we may be entitled to receive under any guarantee or warranty given to us in respect thereof. This Condition excludes every warranty, condition or liability not herein expressly set out and all liability for every form of consequential damage or loss and damage or loss caused by the negligence of us our servants or agents is hereby expressly excluded; provided that this condition shall only exclude or restrict the liability and remedy mentioned in Section 3 of the Misrepresentation Act 1967 to the extent therein mentioned.

1.6. REPAIRS

We are not responsible for damage to goods sent to us for repair or examination, nor for incidental damage to glass apparatus and delicate instruments in the course of repair. In the event of no order being placed we may charge for time involved in the preliminary examination and the reassembly of any article. Goods returned for repair should be sent carriage paid, and be clearly labelled with the sender's name and address, and at the same time a letter should be sent detailing the work required.

1.7. CATALOGUES, ETC.

Illustrations and descriptions of goods in our catalogues and other literature are believed to be correct at the date of going to press. Designs and sources of supply are however subject to alteration without notice and the right is reserved to fulfil orders from available stocks. The contents and arrangements of all catalogues and other literature published by us are protected by copyright, and may not be reproduced or used in whole or in part without our specific permission.

Goods of foreign manufacture are identified by an asterisk preceding the catalogue number. Prices of such items include customs and other charges unless otherwise specified.

1.8. LAW OF CONTRACT

The contract shall in all respects be construed and take effect in accordance with the laws of England.

CONDITIONS OF SALE

SECTION 2.

Applicable in addition to Section 1 to orders for delivery in the United Kingdom.

2.1. TERMS OF PAYMENT

Prices are strictly nett for prompt monthly payment and no deductions can be allowed. Either a remittance or two approved trade references and a Banker's reference should accompany orders from customers who have no previous account.

2.2. CARRIAGE

Unless otherwise agreed and stated in writing in respect of individual transactions, the Company reserves the right to make a charge for carriage, irrespective of the mode of delivery, on acids and dangerous chemicals, on laboratory furniture and fittings and other bulky items, and on orders to the value of £25·00 or under. When a carriage charge is made, it will be shown on the invoice.

2.3 DAMAGE OR LOSS IN TRANSIT

No claims shall be made on us for breakage, loss or damage in transit, except where goods are conveyed by our own motor transport (which delivers over most of the country). Where goods are not conveyed by our own transport all goods shall be at the risk of the Purchaser or its consignee from the time they leave our premises or those of our agents. Both the carriers concerned and ourselves should be advised in writing of breakages within three days of receipt of goods and of non-delivery within 14 days from date of advice of despatch. Any claim for shortages, errors or breakages, loss or damage in transit by our own transport must be so notified to us in writing within 3 days of receipt of the goods and any claim for non-delivery by our own transport must be so notified within 14 days from the date of advice of despatch. In the event of no such notification being received by us the goods shall be deemed to have been delivered complete and in compliance with the contract requirements.

2.4. CASES AND CONTAINERS

Cases and other containers where chargeable will be invoiced to customers unless returned in good condition and carriage paid to our warehouse within 60 days from receipt. Charges for cases or containers must not be deducted from our account unless a credit note has been issued in respect of same. Contaminated containers are valueless and no credit can be given in respect of them.

2.5. INSURANCE

If requested by the Purchaser or considered necessary by us we will effect insurance against transit risks at the cost of the Purchaser. If we effect insurance we shall be under no liability to take proceedings for recovery of any loss or damage and if we do claim as agents for the Purchaser our responsibility shall be limited to accounting for any amount received by us and we may deduct any reasonable expenses incurred by us.

2.6. SALE OF POISONS

The sale of listed poisons is restricted by the Pharmacy and Poisons Act, 1933, and by the Poison Rules. We supply poisons only to persons requiring them (a) for use for resale in trade or business or (b) for scientific education or research. Poisons in the First Schedule to the Poison Rules are prefixed 'S.1' in our catalogues. For the purchase of these poisons a written order on the Purchaser's official order form is required, signed by the Purchaser, stating his name, address, trade, business or profession, and the purpose for which the poison is required.

SECTION 3.

Applicable in addition to Section 1 to orders for final delivery outside the United Kingdom.

3.1. CHARGES

All cases and other containers, packages, packing materials, delivery to docks, dock dues, port rates and customs entry, F.O.B. delivery charges, freight, insurance and other charges are chargeable to the Purchaser unless expressly specified by us to the contrary. When we submit a quotation or proforma invoice giving additional charges for:

"CASES, PACKING & DELIVERY F.O.B. LONDON
EXCLUDING CUSTOMS ENTRY"

it should be understood that the figure quoted also excludes Shipping Charges, Bills of Lading and any Consular Invoice or Certificate of Origin which may be required unless we specifically state that costs for these are included.

3.2. IMPORT LICENCES

Where restrictions on import into the country of destination are in force all orders must be accompanied by the number and date of expiry ot the import licence.

3.3. TERMS OF PAYMENT

(a) **Orders from Purchasers in the United Kingdom.** Prices are strictly nett for prompt monthly payment and no deductions can be allowed. Either a remittance or two approved trade references and a Banker's reference should accompany orders from customers who have no previous account.

(b) **Orders from Purchasers outside the United Kingdom.** Unless other arrangements are agreed and made in writing in approved cases, payment shall be by an irrevocable letter of credit confirmed by a London Bank. When an order is for a large number of items, the letter of credit should preferably allow for part payments and shipments. All expenses in respect of such payment must be discharged by the Purchaser.

3.4. DELIVERY

When we state a delivery time on our quotation, proforma invoice, acknowledgment of order, etc. it is to be understood that this is the time we estimate within which we can have the goods ready packed for shipment (please refer to Condition 1.4). Where the order requests us to apply for shipping instructions, instructions for delivery must be furnished to us within 30 days from the date of our application. We cannot accept any responsibility for delays in despatch caused through non-availability of shipping space.

3.5. INSURANCE

(a) **Cover.** We can accept no responsibility for the failure to insure goods unless we have specific instructions to insure them, in which case we will insure only for the C.I.F. value, plus 25%, unless other instructions are given.

(b) **Claims.** However the goods were insured, we shall not be obliged to claim in respect of damage or loss. We will, however, when the goods are insured by our own arrangements, if particularly requested to do so, submit a claim to the underwriters for the insured value of the damage or loss. In such cases we will, if requested, supply free replacements to the C.I.F. value of the amount received from the underwriters, less reasonable charges for negotiating the claim, but we will be under no further liability.

3.6. PACKING

We advise Purchasers to leave the packing of goods for export to our discretion. It will assist us if the following information is given when ordering :—

(a) Shipping Mark.
(b) Limits, if any, as to weight and size of packages.
(c) Directions as to route, e.g. by mail or other steamer, or by air.
(d) All information necessary to make Consular declarations.

3.7. DAMAGE OR LOSS IN TRANSIT

No claims shall be made upon us for breakage, loss or damage in transit, and any claim shall be made direct against the persons responsible.

3.8. SHORTAGES OR ERRORS

No claims can be entertained unless notification in writing is despatched to us within 3 days of the receipt of the goods by the Purchaser or consignee.

CONDITIONS OF SALE

SECTION 4.

Discounts available on certain groups of goods.

In order to ensure recognition of these discounts and to facilitate accountancy it is recommended that such orders should be on a separate order sheet from other goods.

ORDER VALUE DISCOUNTS

Discounts based on the value of an order are applicable to certain groups of goods listed below.

Order value discounts apply to one order for one group of goods for delivery to one address in one consignment.

GROUP 1. TECHNICO, SINTAGLASS AND Ⓐ SCIENTIFIC GLASSWARE

(All goods listed with code letter 'a' following the price.)

Orders of £100·00 or over, list price value less 3%
" " £250·00 " " " " " 5%
" " £500·00 " " " " " 10%

GROUP 2. QUICKFIT LABORATORY APPARATUS

(All *Quickfit* and *Clearfit* standard joint and general glassware listed with code letter 'm' following the price. The discounts **do not apply** to items listed with code 'f' following the price.)

Orders of £250·00 or over, list price value less 7½%
" " £500·00 " " " " " 15%

GROUP 3. ROYAL WORCESTER LABORATORY PORCELAIN

Orders of £25·00 or over, list price value less 3%
" " £50·00 " " " " " 5%
" " £100·00 " " " " " 7½%
" " £250·00 " " " " " 10%

QUANTITY DISCOUNTS

Discounts based on the quantity of goods on an order are applicable to certain groups of goods listed below.

Quantity discounts in Group 10 apply to individual items on one order for delivery to one address in one consignment.

Quantity discounts in Groups 11 and 12 apply to one order for one group of goods for delivery to one address in one consignment.

GROUP 10. GALLENKAMP APPARATUS AND INSTRUMENTS

(All goods listed with code letters 'b' or 'g' following the price.)
For goods where an **each** price only is listed.

Order for 3 of an item less 3%
" " 5 " " " 5%
" " 10 " " " 10%

If a **10** price is listed, the discounts will be allowed respectively on 30, 50 and 100.

If a **100** price is listed, the discounts will be allowed respectively on 300, 500 and 1000.

If a **gross** price is listed, the discounts will be allowed respectively on 3, 5 and 10 gross.

GROUP 11. PYREX BRAND LABORATORY GLASSWARE

Order for 50 standard packages less 5%
" " 100 " " " 10%
" " 200 " " " 15%

GROUP 12. FIRMASIL BRAND LABORATORY GLASSWARE

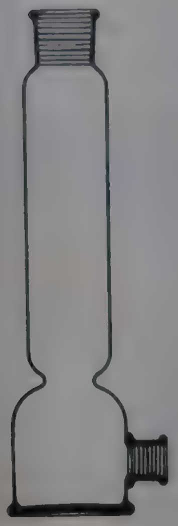
Discounts as for group 11.

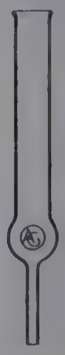
BRITISH STANDARDS

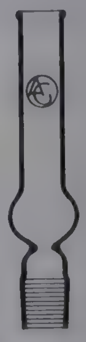
The following list is a selection of British Standards either specifying laboratory apparatus or containing useful information.

Copies of Standards are available from The British Standards Institution, Sales Branch, Newton House, 101 Pentonville Road, London, N.1, or from appointed sales agents overseas.

BS No.	TITLE
188	Viscosity of liquids in absolute units.
350	Conversion factors and tables.
410	Test sieves.
501	Metric units of volume and standard temperature of volumetric glassware.
572	Interchangeable conical ground joints
593	Laboratory thermometers.
604	Graduated measuring cylinders.
611	Petri dishes.
612	Nessler cylinders.
615	Kohlrausch flasks.
619	Incubator, water bath and oven thermometers.
625	Bacteriological test tubes.
658	Apparatus for determination of distillation range.
675	Sugar flasks.
676	Flasks with graduated necks.
691	Clinical maximum thermometers.
692	Meteorological thermometers.
696	Fat in milk products by the Gerber method.
700	Graduated pipettes.
701	Brewers' mash flask.
718	Hydrometers.
733	Density bottles.
734	Hydrometers for use in milk.
748	Haemacytometer counting chambers.
756	Dean and Stark apparatus.
769	Chemical analysis of butter.
770	Chemical analysis of cheese.
773	Ostwald-Folin pipettes.
791	Bomb calorimeter thermometers.
795	Ampoules.
830	Winchester bottles.
846	Burettes.
894	Ubbelohde apparatus.
914	Quality of laboratory porcelain.
1016	Analysis and testing of coal and coke.
1017	Sampling of coal and coke.
1132	Automatic pipettes.
1365	Short-range short-term thermometers.
1428	Microchemical apparatus.
1583	One mark pipettes.
1704	General purpose thermometers.
1733	Flow cups and methods of use.
1739	Filter flasks.
1741	Chemical analysis of liquid milk.
1742	Chemical analysis of condensed milk.
1743	Chemical analysis of dried milk.
1751	Glass stopcocks.
1752	Laboratory sintered or fritted filters.
1756	Sampling and analysis of flue gases.
1792	One mark volumetric flasks.
1797	Calibration tables for volumetric glassware.
1848	Glass condensers.
1923	Glass filter funnels.
2011	Climatic and durability tests.
2021	Separating funnels.
2058	Weighing pipettes.
2069	Gas sampling tubes.
2070	Lunge nitrometers.
2071	Soxhlet extractors.
2461	Gas washing bottles.
2511	Water by the Karl Fischer method.
2554	Westergren tube.
2586	Glass electrodes.
2646	Copper autoclaves.
2648	Performance tests for electric drying ovens.
2701	Rees Hugill powder density flask.
2735	Iodine flasks.
2761	Spherical ground glass joints.
2774	Drawing conventions for glass apparatus.
2775	Rubber stoppers and tubing.
2839	Pensky-Martens flash point apparatus.
2840	Maximum and minimum thermometers.
2841	Wet and dry bulb hygrometer.
2842	Whirling hygrometer.
2843	Spirit-in-glass metal sheathed thermometer.
2877	Drop point of petroleum grease.
2878	Tetraethyl lead in gasoline.
2882	Water and sediment in oils.
2982	Scalpels with detachable blades.
3095	Freezing point of milk.
3156	Sampling and analysis of fuel gases.
3166	Thermographs (liquid or vapour filled).
3202	Laboratory furniture.
3218	Test tubes and boiling tubes.
3231	Thermographs (bimetallic).
3235	Test methods for bitumen.
3292	Hygrometers.
3324	Vapour pressure of liquefied petroleum products.
3325	Reid vapour pressure of petroleum products.
3406	Particle size of powders.
3421	Performance of electric sterilising ovens.
3442	Abel flash point apparatus.
3473	Testing chemical resistance of laboratory glassware.
3517	Thermal shock tests on laboratory glassware.
3763	International system (SI) units.
3787	Glass condensers with standard joints.
3804	Calorific value of fuel gases.
3898	Laboratory humidity ovens (injection type).
3900	Methods of test for paint.
4316	Measurement of packed red cell volume.


AB-525


AB-600


AB-620

AB-525

ABSORPTION TOWERS, borosilicate glass, with standard ground joints; neck 34/35 and outlet 14/15. **Without stopper or stopcock.**

Size	25×5	30×5 cm	
Each	**£1·40**	**1·70**	*m*

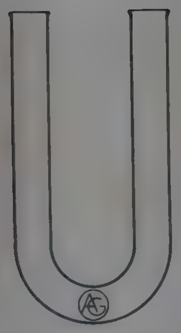
ACCESSORIES

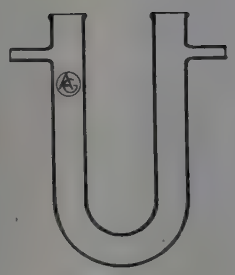
Q-MF 10/1B	**Adapter,** joint 14/15 ...	For details and prices see entries in *Quickfit* section.
Q-MF 11/1B	**Stopcock,** joint 14/15 ...	
Q-MF 10/5B	**Adapter,** joint 34/35 ...	
DK-469	**Stopcock,** joint 34/35. in List No. sequence.	For details and price see entry

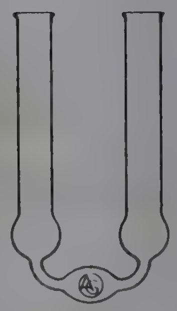
AB-600

ABSORPTION TUBES, (AG), **straight form,** with one bulb and tube long enough for bending. The specified length excludes the narrow connecting tube.

Length	10	15	20 cm	
Diameter	12	20	25 mm	
Ten	**£0·90**	**1·25**	**1·40**	*a*
Each	**£0·16**	**0·19**	**0·21**	


AB-650


AB-655


AB-660

AB-620

ABSORPTION TUBE, (AG), **straight form,** borosilicate glass, with bulb and 14/15 cone joint, for use as desiccant guard tube. Overall length 100 mm, internal diameter 10 mm ... ... Ten **£5·00** Each **£0·56** *a*

AB-650

ABSORPTION TUBES, (AG), **U shape,** plain form.

Length	10	12·5	15 cm	
Diameter	12	15	20 mm	
Ten	**£1·35**	**1·40**	**1·75**	*a*
Each	**£0·20**	**0·21**	**0·24**	

AB-655

ABSORPTION TUBES, (AG), **U shape,** with side arms.

Length	10	12·5	15 cm	
Diameter	12	15	20 mm	
Ten	**£1·75**	**1·85**	**2·40**	*a*
Each	**£0·24**	**0·25**	**0·31**	

AB-660

ABSORPTION TUBE, (AG), **U shape, Wohler,** with 3 bulbs. Length 15 cm, diameter 20 mm.
Ten **£3·20** Each **£0·38** *a*

SINTAGLASS GAS WASH BOTTLES

—capacities 125, 250 and 500 ml

—porosities 0, 1 and 2

For details and prices see GF-640 et seq. in List No. sequence.

PACKING MATERIALS

GLASS BALLS, solid see GR-100

SILICA GEL, self indicating see DK-665

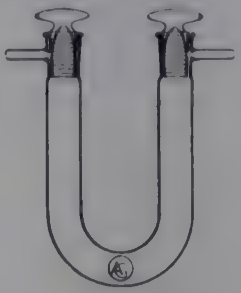
For details and prices see entries in List No. sequence.

All items on this page normally available from stock.

AB-665

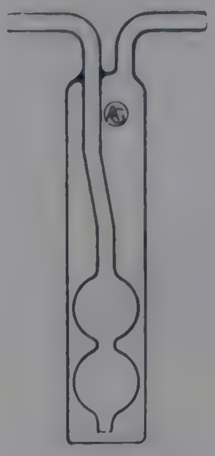
ABSORPTION TUBES, Ⓐ, **U shape,** with side arms and two ground-in stopper stopcocks.

Length	100	125	150 mm	
Diameter	12	15	20 mm	
Ten	£7·00	9·00	9·60	*a*
Each	£0·78	1·00	1·06	


AB-665

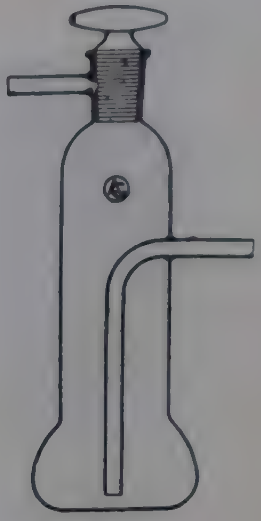
AB-700

ABSORPTION TUBE, Ⓐ, **Arnold,** borosilicate glass, overall height 125 mm.
Ten **£5·10** Each **£0·57** *a*


AB-700

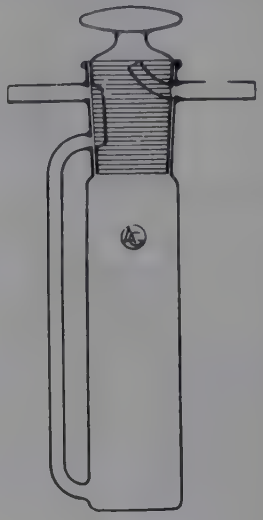
AB-710

ABSORPTION TUBE, Ⓐ, **Midvale-Stetser Norton,** borosilicate glass, height 125 mm, ground-in stopper.
Ten **£10·40** Each **£1·16** *a*


AB-710

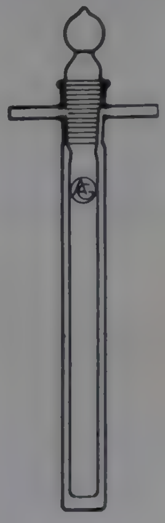
AB-730

ABSORPTION TUBE, Ⓐ, **Nesbitt,** borosilicate glass, height 125 mm, capacity 50 ml.
Ten **£24·50** Each **£2·75** *a*


AB-730

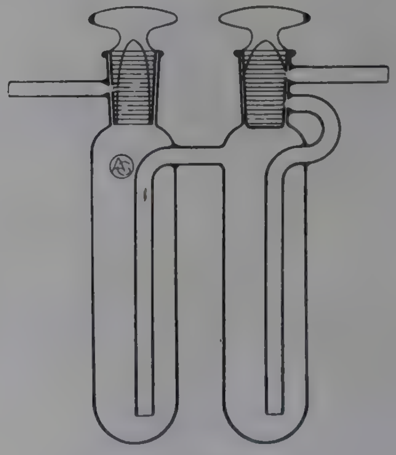
AB-750

ABSORPTION TUBE, Ⓐ, **Riley,** borosilicate glass, to BS 1016, Part 3, 200×20 mm, with concentric inner tube fitted with ground joint.
Ten **£8·20** Each **£0·92** *a*


AB-750

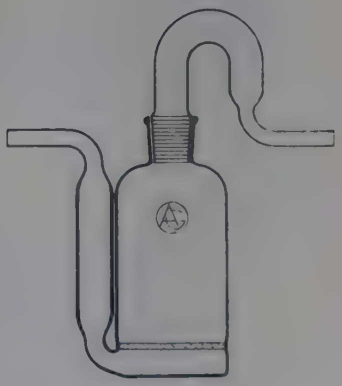
AB-770

ABSORPTION TUBE, Ⓐ, **Blount,** as described by Haldane & Graham in 'Methods of Air Analysis', for absorption of moisture and carbon dioxide.
Ten **£30·00** Each **£3·40** *a*


AB-770

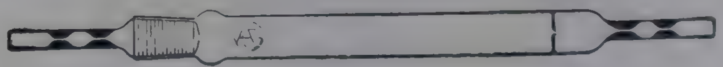
AB-800

ABSORPTION TUBE, Ⓐ, borosilicate glass, with sintered distributor plate 30 mm dia., porosity 2 with guard tube, cone and socket 12/14. Approximate weight 40 g, height 120 mm. Ten **£19·00** Each **£2·10** *a*


AB-800

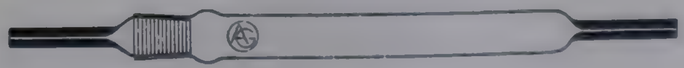
AB-860

ABSORPTION TUBE, Ⓐ, **Pregl, micro,** soda-lime glass, to BS 1428, part A1, Type 1, with perforated diaphragm and hollow ground-in stopper. Filling length 85 mm, overall length 165 mm. Weight 8 g.
Ten **£22·50** Each **£2·50** *a*


AB-860

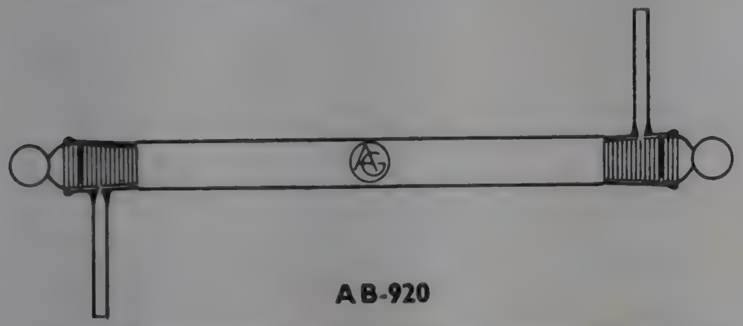
AB-865

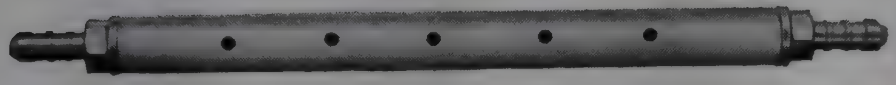
ABSORPTION TUBE, Ⓐ, **Pregl, micro,** borosilicate glass, to BS 1428, part A1, Type 2, with hollow ground-in stopper and capillary end tubes. Filling length 85 mm, overall length 165 mm. Weight 8 g.
Ten **£15·00** Each **£1·70** *a*


AB-865

All items on this page normally available from stock.

AB-920
ABSORPTION TUBE, Ⓐ, **Flaschenträger type,** soda-lime glass, with hollow blown stopper-stopcocks at each end. Dia. 10 mm, filling length 90 mm, overall length 145 mm. Weight 10 g. Ten **£22·50** Each **£2·50** *a*


AB-920


AB-940

AB-940
ABSORPTION TUBE, metal sheathed, suitable for connection in a flexible gas line and for drying cylinder gases. The absorption tube, capacity about 12 ml, is of heavy wall glass which will withstand over 20 atmospheres internal pressure. It is contained in a tubular steel sheath which is drilled to enable the charge to be viewed. Hose nozzles screw into each end of the steel tube and seal with 'O' rings in the glass tube. Dismantling and re-packing with solid charge can be done in less than 1 minute. The hose nozzles are suitable for 6·5 or 8 mm bore flexible rubber or plastics hose ... ... Each **£3·40** *b*

REPLACEMENT PARTS

AB-942	**Glass tube**	Each	**£0·20**	*b*
AB-943	**Toroidal sealing rings** ...	Pack of 10	**£0·25**	*b*

ADHESIVES

The following table is a guide to the selection of adhesives for common applications. For special purposes preliminary trials may be necessary.

List No.	Description	Drying/setting time	Appearance of dry film	Bond withstands	Types of materials joined	Examples of applications
AE-040	Epoxy resin and hardener	12 hrs at 16°C ½ hr at 150°C	Amber, translucent, rigid	Water up to 100°C. Acid and alkali solutions. Dry heat to 150°C	Porous or non-porous rigid solids, thermosetting resins, etc.	Bonding ceramics, metal, glass, wood. Casting. Encapsulating
AE-050	Neoprene/resin solution impact adhesive. Ester/hydrocarbon solvent	10–35 minutes	Yellow/brown opaque flexible	Water. Acid and alkali solutions. Dry heat up to 60°C	Laminated and other rigid plastics to solid surfaces. Also fibrous materials	Bonding decorative laminates, PVC, etc. and thermoplastics *except* polythene, polypropylene and expanded polystyrene to metal, wood or board. Leather, fabrics. Unsuitable for use with cellulose paint
AE-082	Rubber/resin solution impact adhesive. Petroleum solvent	About 30 minutes	Black rubbery	Water. Dry heat up to 50°C	Porous or non-porous flexible or rigid solids	Bonding rubber, linoleum, cork, felt, etc. to wood, metal. Suitable for fixing Technolite and black Technoplate
AE-084	Synthetic rubber/resin solution impact adhesive. Ketone solvent	5 to 10 minutes	Colourless, transparent, flexible	Water. Acid and alkali solutions. Dry heat up to 85°C	Porous or non-porous flexible or rigid solids	Bonding PVC, leather, fabrics, metal, glass, wood and thermoplastics *except* polythene, polypropylene and expanded polystyrene
AE-090	PVA emulsion in water	10–25 minutes	Colourless, translucent, semi-flexible	Dry heat up to 60°C	Natural or fabricated fibrous solids	Bonding wood, board, paper, fabrics, cork and expanded polystyrene
AE-200	Perspex (PMM) solution in chlorinated hydrocarbon	Initial setting: 3 hours, full hardness: 2 weeks at 25°C or 6 hours at 60°C	Colourless, transparent	Water. Acid and alkali solutions. Dry heat up to 70°C	Perspex, Plexiglas, Diakon and other forms of PMM (Acrylic) plastics	Assembly of fabrications from sheet, mouldings, tubing of PMM

AE-040
ADHESIVE, *Araldite*, with properties as tabulated above. Supplied in a pack containing a tube of resin, a tube of hardener, and instructions for use ... Pack **£0·30** *m*

AE-050
ADHESIVE, *Evo-stick*, with properties as tabulated above. Supplied in small collapsible tube. With instructions for use ... ... Each **£0·20** *c*

AE-082
ADHESIVE, *Bostick* **'C',** with properties as tabulated above. Supplied in tin containing 10 fl oz. Each **£0·25** *c*

AE-084
ADHESIVE, *Bostick* **clear,** with properties as tabulated above. Supplied in small collapsible tube. Each **£0·13** *m*

AE-090
ADHESIVE, *Evo-stick* **Resin W,** with properties as tabulated above. Supplied in plastics dispenser bottle containing 4 fl oz ... ... Each **£0·17** *m*

AE-200
ADHESIVE, *Perspex*, with properties as tabulated above. Supplied in tin containing 10 fl oz ... Each **£0·45** *m*

VB-886
APIEZON GREASE W. Suitable for making gas tight connections in combustion trains, etc. For details and price see entry in List No. sequence.

All items on this page normally available from stock.

AIR PUMPS

AF-320

AIR PUMP, hand operated, compression and exhaust, with barrel 17·5 × 3 cm and corrugated nipples for tubing connection ... ... Each **£6·75** *c*

AF-380

AIR PUMP, piston type, for general aerating purposes. The pump is driven by a sturdy rotating disk 20W induction motor, and is very quiet in operation. Solid bearings and a ringed, self-lubricating double acting piston ensure trouble-free continuous running. The output of the pump is about 0·75 l/min at 0·4 kgf/cm². For 230/250V 50 Hz single phase supplies.
Each **£7·25** *m*

AF-385

AIR PUMP, piston type, for general aerating purposes, similar to AF-380 but with twin double acting pistons and outlets arranged for both suction and pressure. The output from the pump is about 1·4 l/min. For 230/250V 50 Hz single phase supplies ... Each **£10·00** *m*

AF-400

AIR PUMP, diaphragm type, for general aerating purposes. A quiet running pump operated by a solenoid and fitted with a neoprene diaphragm. Output is about 1·5 l/min free air, maximum pressure 0·15 kgf/cm². In moulded plastics case mounted on foam rubber. For 200/240V a.c. single phase supplies, consumption 3 watts.
Each **£1·37** *m*

REPLACEMENT PART

AF-401 **Diaphragms** pack of 3.
10 packs **£0·62** Pack **£0·14** *m*

AF-410

AIR PUMP, diaphragm type. The neoprene diaphragm is operated by connecting rods from a grease packed ball race eccentric on the motor shaft. It is very quiet in operation, compact and reliable. Can be used for pressure or suction to 300 torr with an output of 4 l/min free air. Fitted with motor, speed control rheostat in base, inlet filter and 5 mm o.d. outlet nozzle. For 200/240V a.c. or d.c. supplies ... ... Each **£12·60** *m*

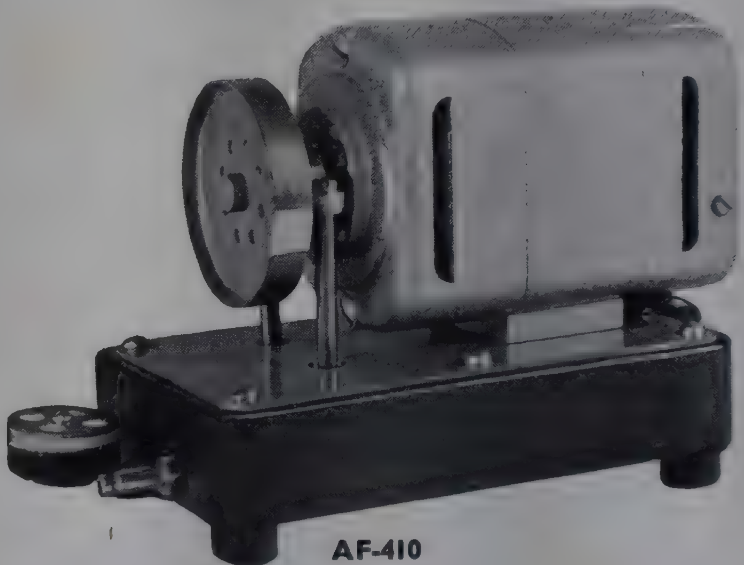
AF-414

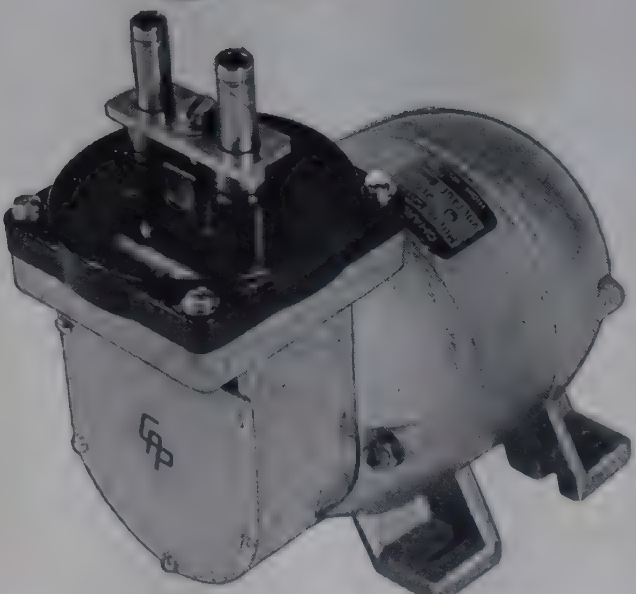
AIR PUMP, diaphragm circulating type. Particularly suitable for closed circuit circulation of air or gases. The diaphragm and disk valves are of neoprene and the pump head of aluminium alloy with chromium plated connecting tubes. Pumping speed is 7 l/min on open circuit. Mounted direct on motor. For 220/240V a.c. supplies.
Each **£15·50** *m*

AF-385
(AF-380 is similar)

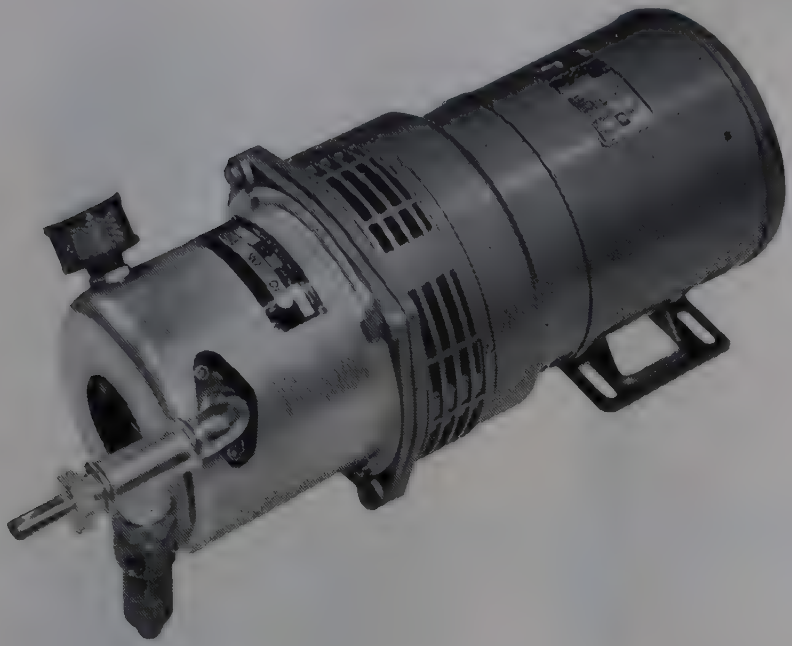
AF-320

AF-400


AF-410


AF-414

All items on this page normally available from stock.



AF-425

AF-425

AIR PUMP, dry rotary. A non-lubricated air cooled rotating vane pump which delivers **oil free air** and is suitable for continuous operation. The pump must not be oiled or greased and the sealed bearings require no attention. Integral with the pump is a ventilated $\frac{1}{2}$ hp split phase motor running at approximately 1425 rev/min. A protective thermal cut-out with manual reset is incorporated in the motor body. Complete with air inlet filter, pressure relief valve set at 0·7 kgf/cm², outlet nozzle suitable for 12·5 mm bore flexible tubing and instructions for use.

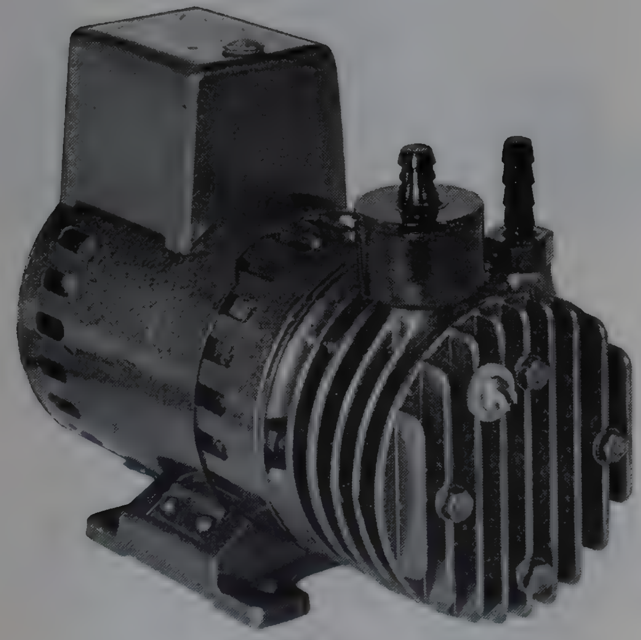
Technical Data

Maximum pressure	0·7 kgf/cm²
Displacement, maximum	210 l/min
Displacement, at 0·7 kgf/cm²	140 l/min
Overall dimensions	60 × 23 × 20 cm high
Weight, net	23 kg

For 220/240V 50 Hz single phase supplies.

Each **£70·80** *m*

COMBINED COMPRESSOR/VACUUM PUMPS



AF-430

AF-430

AIR PUMP, *Edwards* **ECBI.** A non-lubricated rotating carbon vane pump which delivers **oil free air** and is suitable for continuous operation. The pump must not be oiled or greased. Directly coupled to the pump is a $\frac{1}{6}$ hp motor running at approximately 2850 rev/min. Complete with air filter/silencer, pressure relief valve and inlet and outlet riffled nozzles suitable for 6 mm bore flexible tubing.

Technical Data

Maximum pressure	1 kgf/cm²
Vacuum	125 torr
Displacement	28 l/min
Overall dimensions	11 × 21 × 17 cm high
Weight, net	4·5 kg

For 220/240V 50 Hz single phase supplies.

Each **£32·50** *f*

ACCESSORIES

AF-434	**Pressure non-return valve**	Each	£1·60	*f*
AF-436	**Air pressure gauge** with adapter ...	Each	£3·40	*f*
AF-438	**Vacuum non-return valve**	Each	£1·60	*f*
AF-440	**Vacuum gauge** with adapter	Each	£3·40	*f*

TROLLEY-MOUNTED VACUUM PUMP AND COMPRESSOR

A complete, mobile pumping system which can conveniently and quickly be wheeled to any point in the laboratory. For details and price see VB-480 et seq. in List No. sequence.

All items on this page normally available from stock.

COMBINED COMPRESSOR / VACUUM PUMPS

AF-445

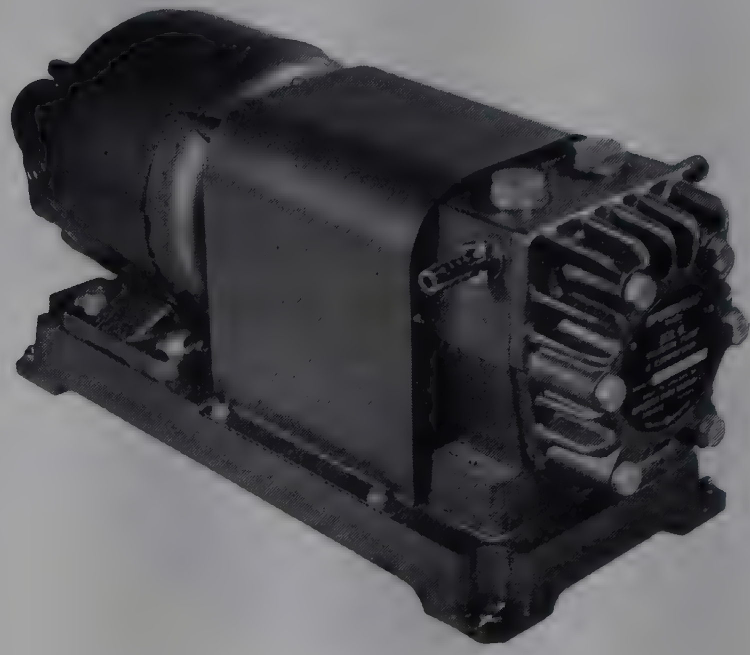
AIR PUMP, *Edwards* **EB3.** An oil lubricated pump mounted on base with directly coupled ⅓ hp motor suitable for continuous operation. With pressure relief valve and riffled inlet and outlet nozzles, suitable for 8 mm bore flexible tubing.

Technical Data

Maximum pressure	1·3 kgf/cm²
Vacuum	100 torr
Displacement	71 l/min
Overall dimensions	19 × 44 × 22 cm high
Weight, net	23 kg

For 220/240V 50 Hz single phase supplies.

Each **£43·50** *fS*



AF-445

ACCESSORIES

AF-447	**Oiler baffle**	Each **£8·00** *fS*
AF-434	**Pressure non-return valve**	For prices see entries in List No. sequence.
AF-436	**Air pressure gauge** with adapter	
AF-438	**Vacuum non-return valve**	
AF-440	**Vacuum gauge** with adapter	

BELLOWS, foot operated, designed to give a steady air pressure. For details see BK-620 in List No. sequence.

AF-458

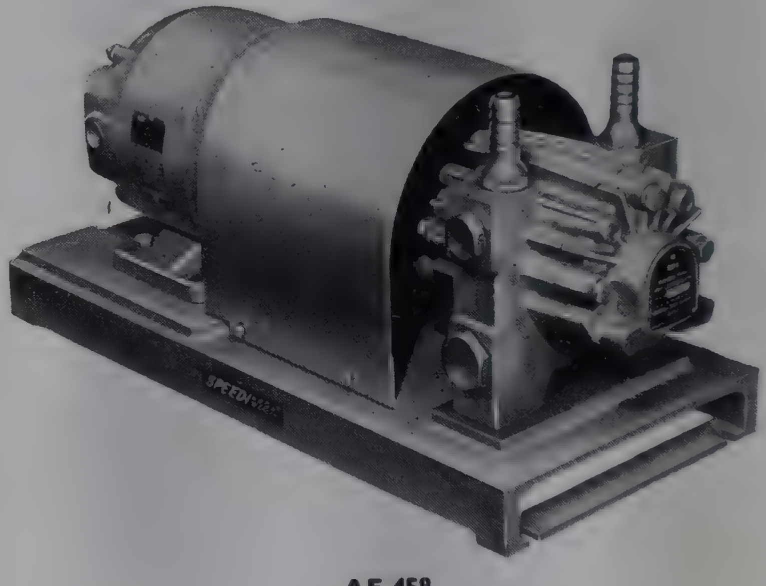
AIR PUMP, *Edwards* **RB5,** mounted on base with ½ hp motor. Complete with adjustable relief valve and inlet and outlet nozzles suitable for 12·5 mm bore flexible tubing. The nozzles can be removed so that permanent connections can be screwed into the apertures.

Technical Data

Pressure	1·0 kgf/cm² continuous 1·4 kgf/cm² intermittent
Vacuum	25 torr without baffle 40 torr with oiler baffle
Displacement	160 l/min
Overall dimensions	19 × 53 × 25 cm
Weight, net	30 kg

For 220/240V 50 Hz single phase supplies.

Each **£72·00** *fS*



AF-458

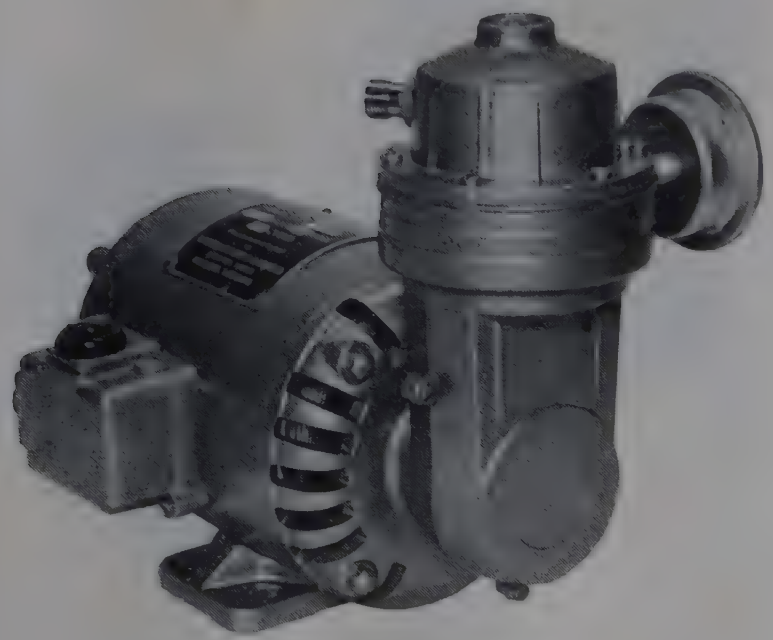
ACCESSORIES

AF-467	**Oiler baffle**	Each **£8·00** *f*
AF-471	**Air pressure gauge with adapter**	Each **£5·90** *f*
AF-475	**Vacuum gauge with adapter and non-return valve.**	Each **£5·90** *f*
LX-130	**Pump oil.** For details and price see entry in List No. sequence.	

HIGH VACUUM PUMPS
see VACUUM APPARATUS

Items on this page coded S normally available from stock.

COMBINED COMPRESSOR / VACUUM PUMPS



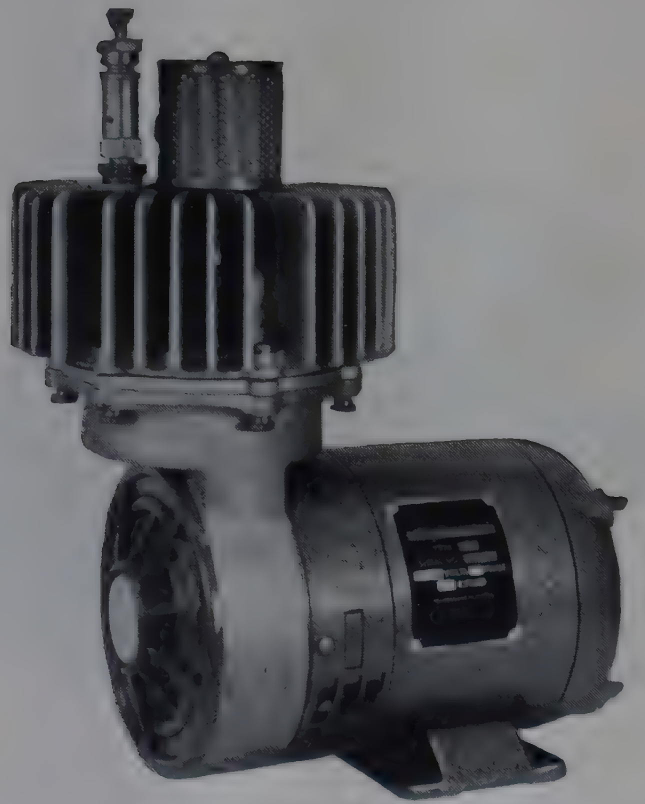
AF-510

AF-510

AIR PUMP, diaphragm. A quiet, low vibration, **oil free** pump designed for continuous running and **especially suitable for use with flame photometers.** The air output, which can be adjusted from 0 to 1·4 kgf/cm² by means of the pressure relief valve, is relatively pulse free as the result of the short pump stroke.

Output pressure kgf/cm²	0	0·35	0·7	1·4
Flow rate to free air l/min	21	20	18	11

The body of the compressor surge chamber and the valve plates are aluminium diecastings. The diaphragm is of nitrile rubber and the flat valves of high carbon steel. A grease packed and sealed ball bearing is used on the big end and no lubrication is required at this point. The inlet is fitted with a large diameter air filter which can be removed to enable the machine to be used for vacuum purposes down to approximately 180 torr. The outlet nozzle accepts 6·5 to 7 mm bore heavy wall flexible tubing. Motor rating ⅛ hp. Overall dimensions 27·3 × 16·5 × 21·6 cm high. Weight, net 8·2 kg. For 220/240V 50 Hz single phase supplies ... ... Each **£42·00** *m*



AF-535

AF-535

AIR PUMP, diaphragm, for **oil free** delivery up to 4·2 kgf/cm². The pump is fitted with a synthetic rubber diaphragm having an average life of 2000 hours. Motor and pump are fitted with ball bearings requiring only yearly attention.

The unit can also be used for vacuum duty for filtration, etc., the valves and fittings being inexpensive to replace in the event of corrosion occurring as the result of contamination. A pressure regulating/safety valve is fitted, with a relief valve for easy starting when pressure remains in the line. The pressure outlet has a male ¼ in BSP thread, which can be replaced by the ½ in hose connector supplied. A suction filter is fitted, which can be removed for vacuum service and replaced by the hose connector.

Technical Data

Maximum pressure	4·2 kgf/cm²
Delivery at 3 kgf/cm²	30 l/min
Vacuum	150 torr
Overall dimensions	32 × 20 × 40 cm high
Weight, net	19 kg
Motor rating	¼ hp

For 220/240V 50 Hz single phase supplies.

Each **£58·00** *m*

For electrically operated **FILTER PUMP** see FD-250 in List No. sequence.

All items on this page normally available from stock.

ALUMINIUM FOIL

Suitable for many purposes in the laboratory, including sealing bottles and culture tubes, stopping leaks, reducing evaporation, covering corks, for thermal insulation or making small weighing boats or dishes. Can easily be labelled with chinagraph pencils, etc.

AL-100

ALUMINIUM FOIL, 7·5 cm wide in roll of 120 metres.
Each £1·13 *c*

AL-105

ALUMINIUM FOIL, 45 cm wide in roll of 75 metres.
Each £2·40 *c*

ACCESSORY for AL-105
AL-107 **Holder,** wall mounting, with cutting edge.
Each £0·60 *c*

ARSENIC DETERMINATION

AP-350

ARSENIC TEST APPARATUS, Gutzeit, to BP specification. Comprises test bottle, delivery tube and rubber test paper holder with clip.
Ten £8·80 Each £0·98 *b*

REPLACEMENT PART
AP-352 **Delivery tube** ... ... Each £0·19 *a*

AMMETERS see ELECTRICAL INSTRUMENTS
APRONS see CLOTHING, protective
AQUARIA see BIOLOGICAL SCIENCES

AP-350

ASBESTOS GOODS

AR-430

ASBESTOS CLOTH, commercial white, approximately 100 cm square by 1·5 mm thick. Packed in polythene.
Each £3·40 *c*

AR-460

ASBESTOS FILTER FIBRE, for use in Gooch crucibles. In pack containing 100 g ... Each £0·55 *c*

AR-470

ASBESTOS MILLBOARD, in sheets approximately 100 cm square.

Thickness	4·5	6 mm	
Each	£1·55	2·10	*c*

AR-472

ASBESTOS MILLBOARD, cut in squares, approximately 3 mm thick. In packs containing 10 squares.

Sizes of square	15	30 cm	
10 packs	£5·10	20·50	*c*
Pack	£0·57	2·30	

AR-490

ASBESTOS PAPER, commercial white, 100 cm wide, 0·4 mm thick. 10 metres £2·20 Metre £0·29 *c*

AR-500

ASBESTOS PAPER TAPE, commercial white, 0·4 mm thick.

Width	25	50 mm	
165 metres	£0·94	1·60	*c*
Metre	£0·13	0·13	

AR-505

ASBESTOS WOVEN TAPE, commercial white. Width 25 mm, thickness 1·5 mm. In polythene wrapped reel of approximately 10 metres.
10 reels £18·00 Reel £2·00 *c*

AR-540

ASBESTOS YARN, commercial white. In 1 lb reels wrapped in polythene.

Diameter	4·5	6 mm	
Ten	£7·60	7·60	*c*
Each	£0·84	0·84	

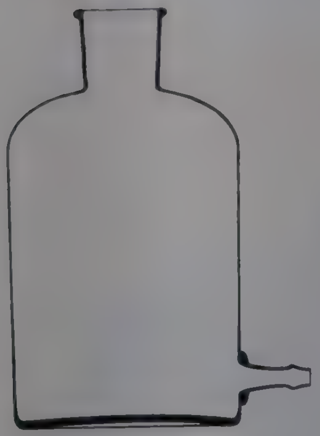
SU-800

STOPPERS, silicone rubber, for use up to approximately 250°C. For details and prices see entry in List No. sequence.

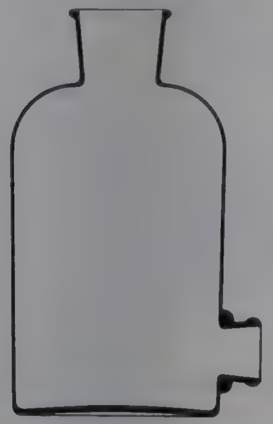
ASBESTOLITE SHEETS see FURNITURE
ASBESTOS blanket see FIRE EXTINGUISHERS
boards see PE-784
gloves see CLOTHING, protective
wire gauze see GAUZES

All items on this page normally available from stock.

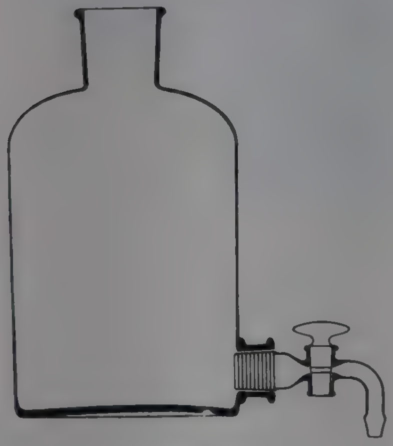
GLASS ASPIRATORS



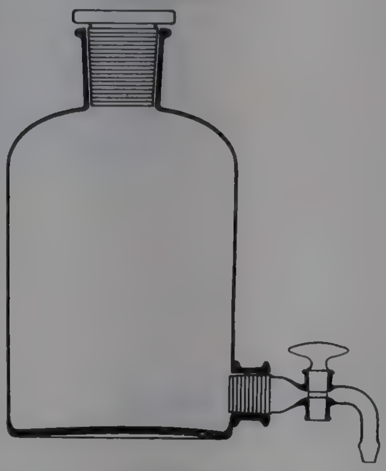
AU-340



AU-342



AU-344



AU-346

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

AU-340

ASPIRATOR BOTTLES, *Pyrex brand* glass, with tubulure at bottom for rubber tubing connection.

Capacity	250	500	1000	2000 ml	
Std. pack qty.	12	12	12	6	
Std. pack	£7·30	10·85	12·60	7·95	*d*
Each	£0·68	1·00	1·18	1·45	

AU-342

ASPIRATOR BOTTLES, *Pyrex brand* glass, with moulded outlet for rubber stopper.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	£3·80	5·20	4·25	6·25	*d*
Each	£1·95	2·70	—	—	

For suitable rubber stoppers see SU-760 to SU-800, Size No. 27, in List No. sequence.

For stopcocks for use in rubber stoppers see ST-420 in List No. sequence.

AU-344

ASPIRATOR BOTTLES, *Pyrex brand* glass, with moulded outlet fitted with ground-in glass stopcock, standard joint 29/32.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	£6·60	9·35	6·25	8·40	*d*
Each	£3·40	4·80	—	—	

AU-346

ASPIRATOR BOTTLES, *Pyrex brand* glass, with moulded outlet fitted with ground-in glass stopcock, standard joint 29/32 and stoppered neck.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	£8·05	11·35	7·60	10·80	*d*
Each	£4·20	5·90	—	—	

REPLACEMENT STOPCOCK

AU-348 **Stopcock,** borosilicate glass, 29/32 cone.
Std. pack of 2 **£2·75** *d*

ACCESSORY STOPCOCKS

AU-367 **Stopcock,** *Flexicon*, borosilicate glass, with two PVC rings around joint to give a degree of flexibility. Suitable for 29/32 socket ... Ten **£16·70** Each **£1·77** *m*

AU-447 **Stopcock,** polythene, 12 mm bore. For details see entry in List No. sequence.

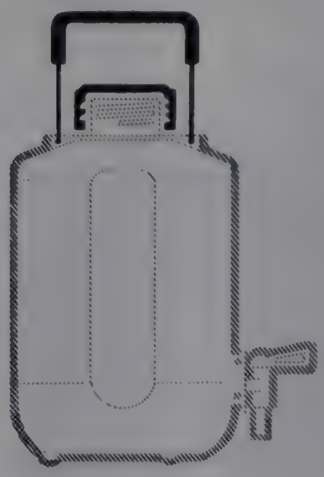
All items on this page normally available from stock.

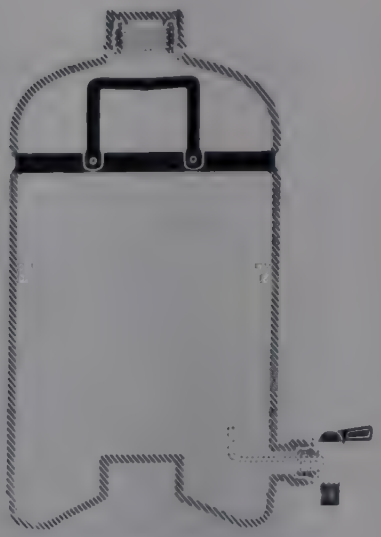
PLASTICS ASPIRATORS

AU-425

ASPIRATOR BOTTLES, rigid polythene, with permanently fitted 8 mm bore stopcock, screw-on cap and plastics covered handle hinged at the neck.

Capacity	2·5	4·5	9 litres	
Each	£1·70	1·75	1·80	c


AU-425


AU-430

***AU-430**

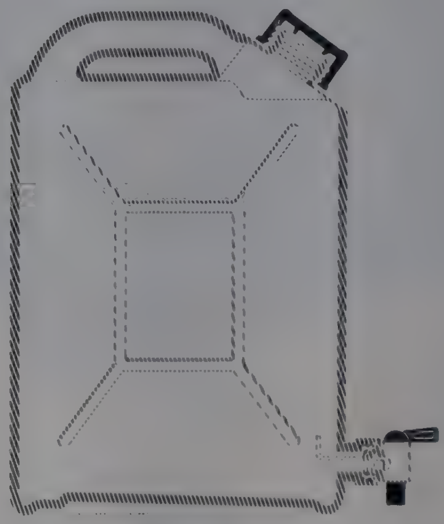
ASPIRATOR BOTTLES, thick polythene, with interchangeable air-vented 12 mm bore stopcock, 5 cm diameter neck with screw-on cap and plastics covered band around shoulder incorporating lifting handles.

Capacity	15	20	25	30	40	60 litres	
Each	£4·40	5·00	5·40	5·70	6·50	8·25	m

***AU-432**

ASPIRATOR BOTTLES, as AU-430, but with 17 cm diameter mouth closed by a press-on cap.

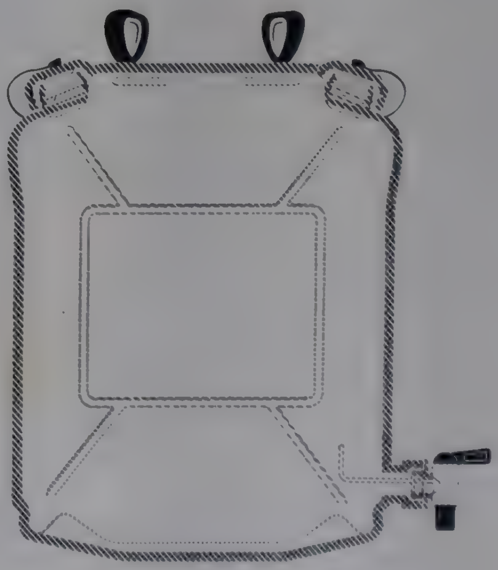
Capacity	25	40	60 litres	
Each	£5·90	7·00	8·75	m


AU-440 (25 litre)

AU-440

ASPIRATOR BOTTLES, thick polythene, rectangular, with interchangeable air-vented 12 mm bore stopcock on the narrow side, screw-on cap, and carrying handle.

Capacity	25	45 litres	
Width	23	27 cm	
Depth	31	39 cm	
Each	£3·50	4·90	m


AU-440 (45 litre)

REPLACEMENT PART for AU-430 AU-432 and AU-440

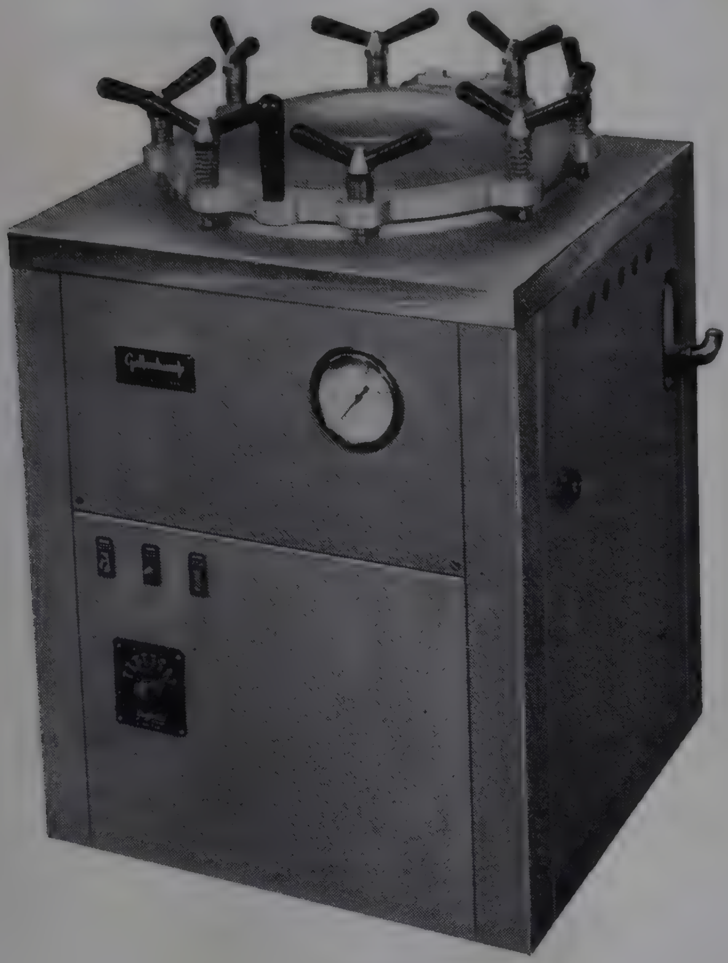
AU-447 Stopcock, polythene, 12 mm bore with air-vent tube. Suitable for 29/32 socket outlets.
Ten £2·20 Each £0·29 c

All items on this page normally available from stock.

Gallenkamp BS AUTOCLAVES

FOR ELECTRIC, GAS OR STEAM HEATING

For the steam sterilisation of surgical instruments, dressings and biochemistry equipment.



AX-100

PERFORMANCE AND DIMENSIONS

Maximum working pressure	2·1 kgf/cm^2 (30 lbf/in^2)	
Heating times	20–100°C	100–130°C
AX-100	25 min	10 min
AX-110	25 min	12 min
AX-120	Depends on steam supply. Normally about 10 mins to 130°C	
Working depth of boiler	46·0 cm	
Internal diameter of boiler	45·8 cm	
	H W D	
Overall dimensions of autoclave	100 × 66 × 100 cm with lid open	
Drain outlet diameter	13 mm	

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

DESIGN APPROVED BY ASSOCIATED OFFICERS TECHNICAL COMMITTEE FOR INSURANCE PURPOSES

- **To BS 2646 'Copper Laboratory Autoclaves'**
- **Safe, reliable and easy to handle**
- **Automatic air vent and safety valve**
- *Compenstat* **control of steam temperature within ±1degC**
- **Sturdily engineered for long life**
- **Outer case remains cool during operation**

OPERATION AND DESIGN

Electrically heated model.

Temperature is controlled by a *Compenstat* direct reading scale thermostat calibrated 100 to 135°C, and a 6 kW immersion heater which is switched by means of a power relay. Indicator lamps show when the mains and heater are ON.

Gas heated model.

Heating is by a high efficiency burner which consumes coal gas at a maximum rate of 2 m^3/hr (70 ft^3/hr). A gas governor corrects for fluctuations in gas supply pressure. The gas is ignited by a press button device which is powered from the mains electricity supply; the device also incorporates an automatic flame failure system. Temperature is controlled by means of a *Compenstat*. Combustion products leave through a chimney to which a flue pipe may be connected.

Steam heated model.

Heating is by direct steam injection into the boiler. Maximum steam consumption is about 9 kg (20 lb) per hour. A steam trap is fitted to drain the condensate automatically.

Gallenkamp BS AUTOCLAVES

GENERAL CONSTRUCTION (ALL MODELS)

The case is made of rigid steel and is mounted on castors for easy movement. The top is stainless steel and all remaining steelwork is rustproofed with exterior surfaces finished in stoved grey enamel.

The boiler is formed from heavy gauge copper with all seams welded, and has a cast gunmetal top rim recessed to accept a rubber gasket. All internal surfaces are heavily tinned.

The cover is a light alloy casting, hinged at the rear and fitted with a lifting handle in front. It is secured by steel captive bolts fitted with plastics hand grips. A spring lifts each bolt away from the boiler when released, so preventing accidental damage when the cover is lowered.

The steam fittings connected to the boiler comprise a pressure gauge, stop valve, adjustable safety valve and automatic air vent. A thermometer pocket between the boiler and the air vent enables the autoclave temperature to be measured with a thermometer. The safety valve is an approved type the setting of which can be locked with the padlock supplied. It is fitted with an easing lever. **A water level indicator AX-145 and steam leak AX-148 are available as optional accessories. These are mandatory in BS 2646 but not always required in use.**

AX-100

AUTOCLAVE, *Gallenkamp*, **vertical type, electrically heated,** as specification, with automatic air vent, *Compenstat*, pressure gauge, safety valve and steam exhaust system. Certificate of test issued. **Without basket, water level indicator or steam leak.** For a.c. single phase supplies.

For 220/240V	Each	**£602·00**	*b*
For 200/210V	Each	**£602·00**	*b*
For 110/120V	Each	**£615·00**	*b*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

AX-104	**Immersion heater** for AX-100 ...	Each	**£10·00**	*bS*

AX-110

AUTOCLAVE, *Gallenkamp*, **vertical type, coal gas heated,** as specification, with automatic air vent, *Compenstat*, pressure gauge, safety valve and steam exhaust system. For operation with town (coal) gas. **Without basket, water level indicator or steam leak.** Certificate of test issued ... ... Each **£646·00** *b*

Requires a.c. single phase supply (100W max.) for ignition device. When ordering please state voltage and frequency of supply.

NOTE

Autoclaves AX-100 and AX-110 can be fitted with low water cut out and with timing controls to govern period of autoclaving. Please send full details of requirements.

AX-120

AUTOCLAVE, *Gallenkamp*, **vertical type, steam heated,** as specification, with automatic air vent, pressure gauge, safety valve, steam condensate trap and steam exhaust system. **Without basket or steam leak.** Certificate of test issued ... ... Each **£626·00** *b*

ACCESSORIES AND REPLACEMENT PARTS for AX-100, AX-110 and AX-120

AX-130	**Lid gasket,** rubber	Each	**£1·70**	*bS*
AX-135	**Basket,** 45 cm dia. × 45 cm deep, strongly constructed in wire mesh with carrying handle ...	Each	**£8·40**	*bS*
AX-137	**Half basket,** 45 cm dia. × 20 cm deep.	Each	**£6·80**	*bS*
AX-140	**Wire separator,** for use when layers of small baskets are inserted in autoclaves. Each separator is about 2·6 cm thick and allows the free circulation of steam.	Each	**£3·75**	*bS*
AX-142	**Reducing valve,** adjustable, to insert in steam supply line to control the operating pressure. When ordering please state supply pressure	Each	**£21·00**	*b*
AX-145	**Water level indicator,** to conform to BS 2646. Not required on AX-120	Each	**£25·00**	*b*
AX-148	**Steam leak,** in place of automatic air vent, to conform to BS 2646	Each	**£11·50**	*b*
TJ-060	**Thermometer,** 0–150°C ...	For prices see entries in List No. sequence.		
TJ-174	**Thermometer,** B160C/100, 99–160°C			

NOTE: Prices for AX-145 and AX-148 apply when ordered with autoclave. Price on application for later fitting.

When ordering replacement parts please state serial number of autoclave and voltage and frequency of supply.

Autoclave for natural gas (methane). Details and quotation on request.

AUTOCLAVES—HIGH PRESSURE

Details on application. Please state full requirements including:

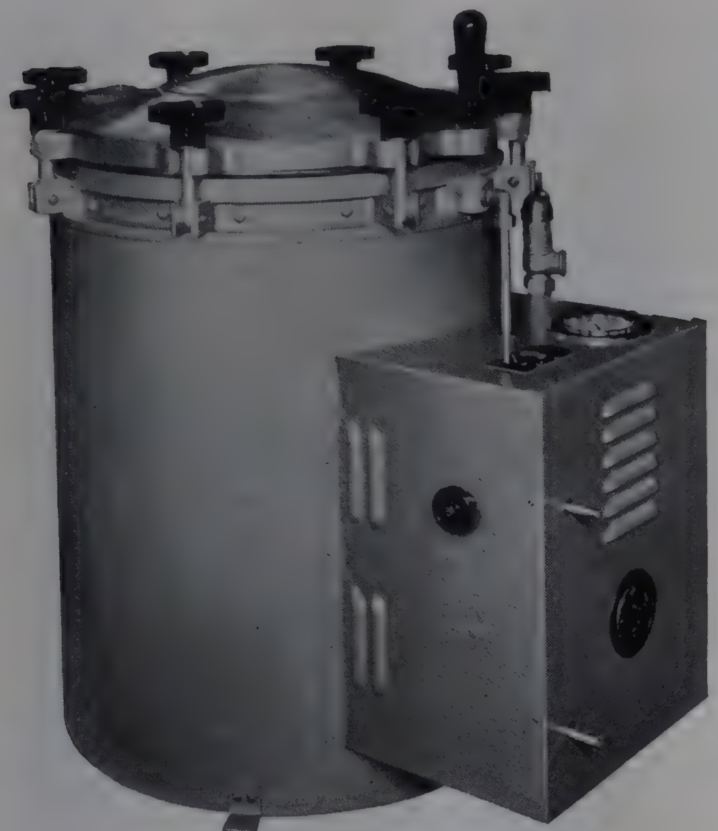
- Nominal capacity
- Horizontal, vertical or rocking
- Temperature and pressure
- Whether stirring required
- Preferred materials, if any
- Intended use

Items on this page coded S normally available from stock.

Gallenkamp AUTOCLAVES

FOR ELECTRIC OR GAS HEATING

For the steam sterilisation of surgical instruments, dressings and biochemistry equipment.



AX-250

- **Vertical and horizontal models**
- **Controlled steam temperature by bimetal thermostat on electrically heated models and gas thermostat on gas heated models**
- **Integral pressure gauge and safety valve**
- **Sturdy construction**

PERFORMANCE AND DIMENSIONS

Maximum working pressure	2·1 kgf/cm^2 (30 lbf/in^2)		
Size	1	2	
Diameter of boiler	34·5	46	cm
Working depth of boiler	30	38	cm
Overall dimensions with lid open			
Vertical autoclaves	H W D	H W D	
List No. AX-250	74×56×75	80×64×100	cm
List No. AX-252	84×54×75	94×64×100	cm
Horizontal autoclaves			
List No. AX-254	79×64×79	91×74×84	cm
Drain outlet diameter	10	10	mm

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

OPERATION AND DESIGN

Electrically heated models.

Heating is by a sheathed immersion heater and temperature is controlled by a bimetal thermostat.

Gas heated model.

Temperature is controlled by an adjustable gas thermostat which regulates the supply of gas to the burner.

GENERAL CONSTRUCTION (ALL MODELS)

The boiler is constructed of copper, with an alloy cover and top ring incorporating a recessed gasket. It is mounted in a steel casing which in the vertical model extends to the floor. The horizontal model is supported on a strong tubular metal stand.

The cover of vertical models is hinged and, after releasing the bolts, may be raised clear of the boiler. Each autoclave is supplied with a wire mesh basket. Horizontal autoclaves have doors hinged on one side and a perforated shelf is supplied with each instead of a wire basket.

Steam fittings comprise a stopcock, adjustable safety valve and pressure gauge, all connected to the body of the boiler. The controls are housed in a control box mounted on the steel casing. The safety valve is an approved type fitted with an easing lever whose setting can be locked with the padlock supplied.

Gallenkamp AUTOCLAVES

AX-250

AUTOCLAVES, *Gallenkamp,* **vertical type, electrically heated,** as specification, with thermostatically controlled immersion heater, pressure gauge, safety valve, and wire mesh basket. Certificate of test issued. For a.c. single phase supplies.

Size No.		1	2	
Power rating, max.		3	5 kW	
For 220/240V	Each	**£360·00**	**497·00**	*bS*
For 200/210V	Each	**£360·00**	**497·00**	*b*
For 110/120V	Each	**£365·00**	**505·00**	*b*

When ordering please state voltage and frequency of supply.

AX-252

AUTOCLAVES, *Gallenkamp,* **vertical type, coal gas heated,** as specification, with gas burner and adjustable gas thermostat, pressure gauge, safety valve and wire mesh basket. Certificate of test issued. For connection to ½ in gas main.

Size No.	1	2	
Each	**£320·00**	**453·00**	*b*

Autoclaves for natural gas (methane). Details and quotation on request.

AX-254

AX-254

AUTOCLAVES, *Gallenkamp,* **horizontal type, electrically heated,** as specification **but** with perforated shelf in place of wire basket. For a.c. single phase supplies. Certificate of test issued.

Size		1	2	
Power rating, max.		3	5 kW	
For 220/240V	Each	**£421·00**	**583·00**	*b*
For 200/210V	Each	**£421·00**	**583·00**	*b*
For 110/120V	Each	**£426·00**	**591·00**	*b*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

AX-256 **Immersion heaters,** for AX-250 and AX-254.

Size No.	1	2	
Each	**£6·25**	**6·40**	*bS*

AX-258 **Lid gasket,** for all models, Size No. 1. Each **£0·57** *bS*

AX-130 **Lid gasket,** for all models, Size No. 2. For price see entry in List No. sequence.

When ordering replacement parts please state serial number of autoclave and voltage and frequency of supply.

Gallenkamp
REGD. TRADE MARK

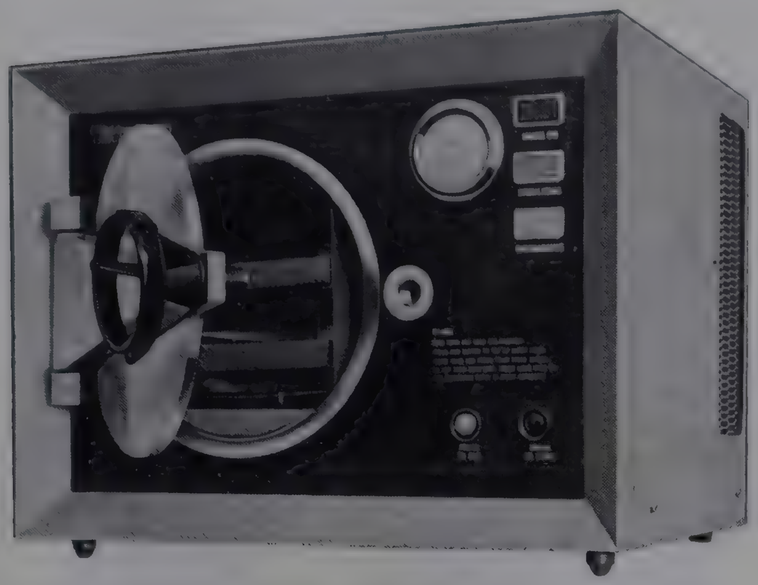
HOT AIR STERILISERS

OV-010	**Hotbox Oven Sterilisers, 200°C maximum.** Two sizes available with wide shelves.
OV-160	**BS Oven Sterilisers, 250°C maximum.** Precise temperature control. Choice of three sizes. Operation to BS 2648 and BS 3421.
OV-420	**Oven Steriliser, 250°C maximum.** Accurate temperature control. Capacity 210 litres. Operation to BS 3421.

For full details and prices see entries in List No. sequence.

Items on this page coded *S* normally available from stock.

AUTOMATIC AUTOCLAVE



AX-360

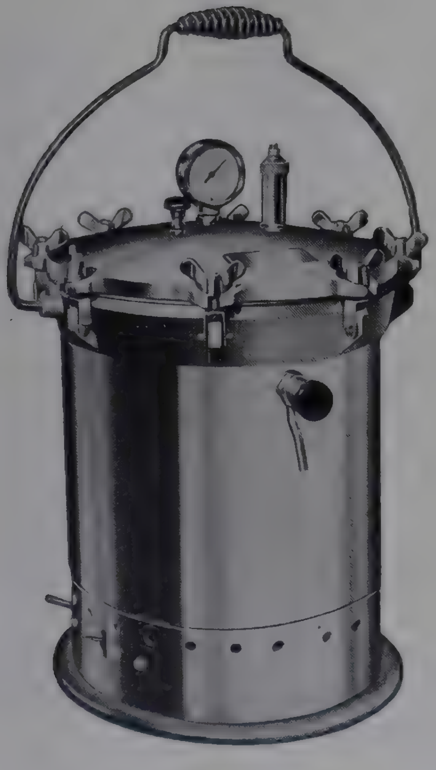
AX-360

AUTOCLAVE, automatic, steam heated by closed circuit steam produced in an integral electrically heated boiler to eliminate the need for an independent steam supply. Sterilisation is at 134°C and the exposure period is timed automatically for a minimum of 3½ minutes starting from when the correct temperature has been reached. Total cycle time, dependent on load, is about 12 minutes. The stainless steel sterilising chamber, 20 cm dia. × 30 cm deep, has positions for four trays 14 × 28 cm. A lock prevents the stainless steel door from being opened under pressure and a safety cut-out protects the chamber contents from overheating. The sterilising and safe discharging periods are shown by separate indicator lamps mounted on the front panel. A mains ON lamp is also fitted. The autoclave has no permanent air bleeds, no escape of steam from the 'circuit' to atmosphere, and no external piping. Overall dimensions: 49 × 36 × 41 cm. Power rating 2 kW. For 220/240V 50 Hz single phase supplies. Complete with two chromium-plated shelves 14 × 28 cm.

Each **£145·00** *fN*

PORTABLE AUTOCLAVES

These autoclaves are tested to twice the normal working pressure before despatch and are approved by insurance companies. Both models are fitted with pressure gauge, drain cock, and adjustable safety valve which can be set at 10 lbf/in² (0·7 kgf/cm²) and 15 lbf/in² (1·05 kgf/cm²). The reduced pressure which develops after sterilisation may be used to produce dry sterile dressings.



AX-382

AX-380

AUTOCLAVE, portable, as specification, **gas heated.** With aluminium boiler, dia. 28 cm, depth 25 cm. Accepts but does not include one dressing drum AX-435. Requires but does not include a gas burner ... Each **£36·00** *m*

AX-382

AUTOCLAVE, portable, as specification, **electrically heated.** With aluminium boiler, dia. 28 cm, depth 25 cm. Fitted with two heaters, maximum power rating 1850W and a 3-heat switch. Accepts but does not include one dressing drum AX-435. For 230/250V a.c. or d.c. supplies ... ... Each **£50·00** *m*

REPLACEMENT PARTS

AX-420	**Heating elements**	Set of 2	**£5·30**	*m*
AX-422	**Lid gasket**	Each	**£0·90**	*m*
AX-426	**Safety valve**	Each	**£2·30**	*m*

ACCESSORIES

AX-435	**Dressing drum,** stainless steel, 24 × 24 cm.	Each	**£10·25**	*m*
BX-305	**Ring burner** for use with AX-380. For details and price see entry in List No. sequence.			

Items on this page normally available from stock except those coded *N*.

BALANCES

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Headquarters and Research and Development Laboratories of Mettler at Greifensee-Zurich Switzerland.

METTLER BALANCES

Gallenkamp are sole distributors for the United Kingdom of Great Britain and Northern Ireland.

The advance of science has always been largely dependent on the development and improvement of measuring techniques. In this context, a major contribution was made when *Mettler* in Switzerland introduced the substitution weighing, single pan analytical balance, employing for the first time the principle of constant beam loading.

In this system the internal weights are suspended on the same end of the beam as the balance pan and are lifted mechanically until the load removed is equal to the weight of the article on the pan so that equilibrium is restored.

Errors due to unequal spacing of knife edges and beam flexing are completely eliminated and the sensitivity of the balance is constant throughout the whole weighing range. *Mettler* are recognised throughout the world as the foremost manufacturers of single pan analytical and precision balances and the following pages present the comprehensive range now available.

METTLER BALANCES INCORPORATE THE FOLLOWING FEATURES:

For accurate weighing

- Weights are manufactured from non-magnetic corrosion resistant nickel-chromium steel.
- Each weight is precision calibrated to an apparent mass density of 8·4.
- Substitution weighing system with constant beam loading.
- Materials used for knife edge suspension systems are chosen for hard wear and long life properties to suit the range of the balance.
- Optical scales, cursors, verniers and digital indicators are designed for quick unambiguous reading.
- Level indicators and adjustable feet are standard.

For rapid weighing

- Wide range optical scales eliminate manipulation of small weights or riders; on many models the addition of weights is eliminated altogether.
- The addition or removal of weights, on those models requiring it, is accomplished simply by knob controls.
- Efficient damping eliminates the time wasted waiting for a swinging beam to settle.
- Partial release of the beam on arrested beam models allows rapid observation of the approach of balance and minimises knife edge wear.
- Several models are equipped with a tare facility to speed operation and eliminate errors of arithmetic subtraction.
- Some analytical models available with pre-weigh facility.

THE RANGE OF *METTLER* BALANCES IS DIVIDED INTO TWO BASIC GROUPS:

Analytical balances

A comprehensive range of ultra-micro, micro, general purpose and heavy duty balances of outstanding performance and reliability and with capacities from 2 mg to 8 kg.

- Corundum bearings, jewelled suspension and patented air damping.
- Single suspended pan.
- Integral annular concentric weights.
- Easily read optical scale.
- Digital reading on some models.
- Draught-proof weighing chamber.
- Print-out, tare, continuous recording, electronic output and below the balance weighing facilities available on many models.

Top loading balances

A comprehensive range of compact balances of outstanding performance and rugged durability for rapid, general purpose weighing from 130 g to 13 kg.

- Silicon carbide knife edges, corundum or hardened steel planes and magnetic damping.
- Single top loading pan.
- Integral annular weights.
- Easily read optical scale.
- Automatic level compensation.
- Tare facility.
- Below balance weighing facility.

In addition to these two major groups, *Mettler* also manufacture a number of balances for special purposes such as precious stone measurements.

Details of *Mettler* balances are given on pages 33 to 45.

METTLER BALANCES

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Mettler **Vibro-Spatula**—see entry SJ-402 under page heading **SPATULAS.**

METTLER BALANCES

BA-500

ULTRA-MICRO ANALYTICAL

*BA-500

BALANCE, ultra-micro analytical, *Mettler* UM7. Capacity **2 mg.** Readability **0·0001 mg.** Precision ±0·0001 mg. Optical scale range 2 mg. Read by means of a built-in microscope and optical micrometer. Complete with two 100 mg tared platinum weighing boats BA-978 ... ... Each **£560·00** *mN*

*BA-502

BALANCE, ultra-micro analytical, *Mettler* UM6. Capacity **10 mg.** Readability **0·0005 mg.** Precision ±0·0005 mg. Optical scale range 10 mg. Read by means of a built-in microscope directly from digital scale. Complete with two 500 mg tared platinum weighing boats BA-978 ... ... Each **£610·00** *mN*

BA-510

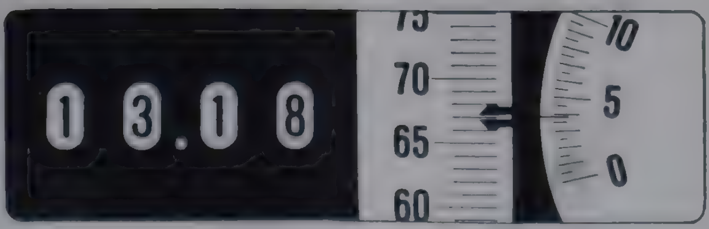
MICRO ANALYTICAL

*BA-510

BALANCE, micro analytical, *Mettler* M5. Capacity **20 g.** Readability **0·001 mg.** Precision ±0·001 mg. Optical scale range 20 mg. Stainless steel pan diameter 40 mm, height of stirrup 110 mm. In white finished light alloy housing. Each **£415·00** *m*

*BA-512

BALANCE, micro analytical, *Mettler* M5 GD. Capacity **20 g.** Readability **0·001 mg.** As BA-510 but with removable attachment for weighing below the balance... ... ... Each **£430·00** *m*



Readout display on BA-510 to BA-514

*BA-514

BALANCE, micro analytical, *Mettler* M5 SA. Capacity **20 g.** Readability **0·001 mg.** As BA-510 but with swing out pan, diameter 30 mm, for simplified loading ... ... Each **£465·00** *m*

Items on this page normally available from stock except those coded *N*.

METTLER BALANCES

SEMI-MICRO ANALYTICAL

***BA-546**

BALANCE, semi-micro analytical, *Mettler* H20.
Capacity **160·1 g.** Readability **0·01 mg.**
Precision ±0·01 mg. Optical scale range 125 mg, total weight displayed digitally. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. In two-tone aluminium alloy housing ... ... Each **£215·00** *m*

***BA-550**

BALANCE, semi-micro analytical, *Mettler* H20 T.
Capacity **160·1 g.** Readability **0·01 mg.**
As BA-546 but with built-in taring system covering the whole weighing range ... ... Each **£255·00** *m*

***BA-560**

BALANCE, semi-micro analytical, *Mettler* H20 P.
Capacity **160·1 g.** Readability **0·01 mg.**
As BA-550 but with print-out facility. After performing a normal weighing operation, the user presses the PRINT button and the weight is recorded on gummed paper tape.
Each **£595·00** *m*

ACCESSORIES

BA-945	**Below Balance weighing attachment,** *Mettler* GD. For BA-546 and BA-560.
BA-946	**Below Balance weighing attachment,** *Mettler* GD. For BA-550.

For details and prices see entries in List No. sequence.

***BA-564**

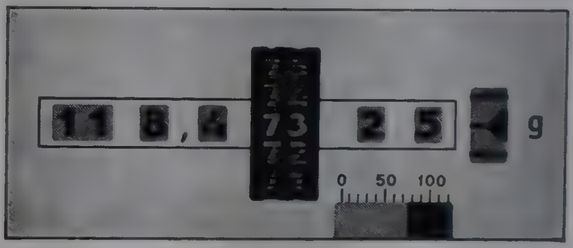
BALANCE, semi-micro analytical, *Mettler* H20 E.
Capacity **162 g.** Readability **0·01 mg.**
As BA-546 but with removable attachment for weighing below the balance and with the optical scale replaced by an electrical scale having three ranges and providing six outputs for the operation of recorders, card or tape punching or printing machines (see table below).
Price from **£635·00** *m*

Range No.		1	2	3
Weight range, g		−0·02 to 0·02	−0·2 to 0·2	−2 to 2
Precision, mg		±0·01	±0·05	±0·5
Electrical Outputs	Load > 10 megohm	1V/mg	0·1V/mg	10V/g
	Load > 50 K ohms	10 mV/mg	1 mV/mg	0·1V/g

NOTE: BA-564 can be supplied with an automatic arrest/release facility and with alternative weighing ranges. Details on request.

Mettler H20

BA-546



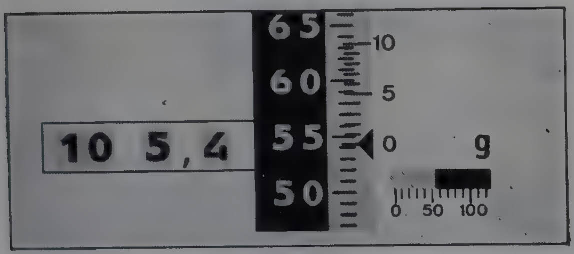
Readout display on BA-546 to BA-560

BA-560

All items on this page normally available from stock.

METTLER BALANCES

BA-580



Readout display on BA-580

ANALYTICAL

***BA-580**

BALANCE, analytical, *Mettler* H18.
Capacity **160·1 g.** Readability **0·05 mg.**
Precision ±0·03 mg. Optical scale range 125 mg with vernier readout. With built-in taring system up to **100 mg tare.** Stainless steel pan, diameter 90 mm, height of stirrup 180 mm. In two-tone aluminium alloy housing.
Each **£200·00** *m*

***BA-600**

BALANCE, analytical, *Mettler* H10.
Capacity **161 g.** Readability **0·1 mg.**
Precision ±0·05 mg. Optical scale range 1000 mg, total weight displayed digitally. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. In two-tone aluminium alloy housing ... ... Each **£165·00** *m*

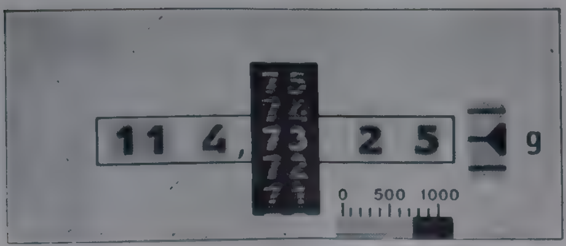
***BA-604**

BALANCE, analytical, *Mettler* H10 W.
Capacity **161 g.** Readability **0·1 mg.**
As BA-600 but with facility for the rapid preweighing of load ... ... Each **£182·00** *m*

ACCESSORY for BA-580, BA-600 and BA-604

BA-945 Below Balance weighing attachment, *Mettler* GD. For details and price see entry in List No. sequence.

BA-600



Readout display on BA-600

Gallenkamp
REGD TRADE MARK

MAINTENANCE SCHEME
FOR USERS IN THE
UNITED KINGDOM

To ensure the continued high performance of your *Mettler* balance, we recommend that you have your balance registered under this scheme so that it may receive regular attention by skilled technicians. Only *Gallenkamp* offer this unique service by *Mettler* trained engineers.

All items on this page normally available from stock.

METTLER BALANCES

ANALYTICAL

***BA-610**

BALANCE, analytical, *Mettler* H10 T.
Capacity **161 g.** Readability **0·1 mg.**
As BA-600 but with built-in taring system covering the whole weighing range ... ... Each **£207·00** *m*

***BA-614**

BALANCE, analytical, *Mettler* H10 T W.
Capacity **161 g.** Readability **0·1 mg.**
As BA-610 but with facility for the rapid preweighing of load ... ... Each **£220·00** *m*

ACCESSORY for BA-610 and BA-614

BA-946 **Below Balance weighing attachment,** *Mettler* GD.
For details and price see entry in List No. sequence.

***BA-620**

BALANCE, analytical, *Mettler* H10 P.
Capacity **161 g.** Readability **0·1 mg.**
As BA-610 but with print out facility. After performing the normal weighing operation the user presses the PRINT button and the weight is recorded on gummed paper tape.
Price from **£565·00** *m*

***BA-630**

BALANCE, analytical, *Mettler* H14.
Capacity **241 g.** Readability **0·1 mg.**
Precision ±0·05 mg. Optical scale range 1000 mg, total weight displayed digitally. With built-in taring system up to **1 g tare.** Stainless steel pan diameter 90 mm, height of stirrup 260 mm. In two-tone aluminium alloy housing ... ... Each **£275·00** *m*

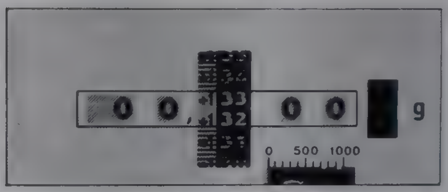
***BA-660**

BALANCE, analytical, *Mettler* H8.
Capacity **160 g.** Readability **0·5 mg.**
Precision ±0·3 mg. Optical scale range 1250 mg with vernier readout. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. In two-tone aluminium alloy housing ... ... Each **£150·00** *m*

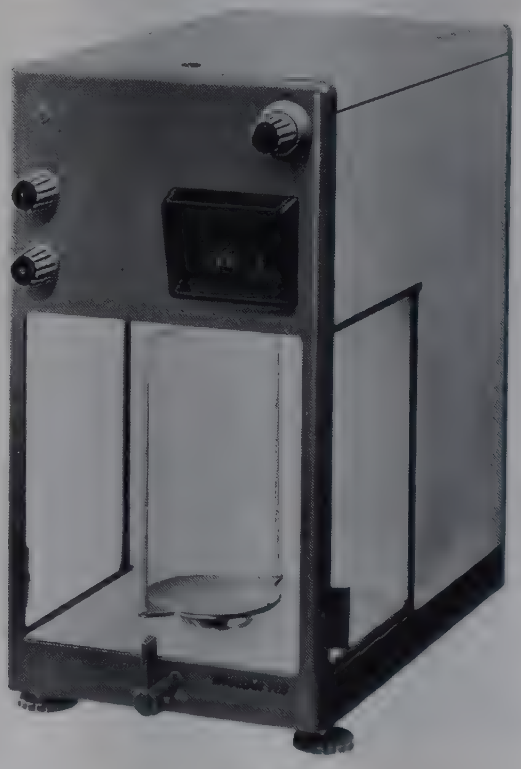
ACCESSORY for BA-620 to BA-660

BA-945 **Below Balance weighing attachment,** *Mettler* GD.
For details and price see entry in List No. sequence.

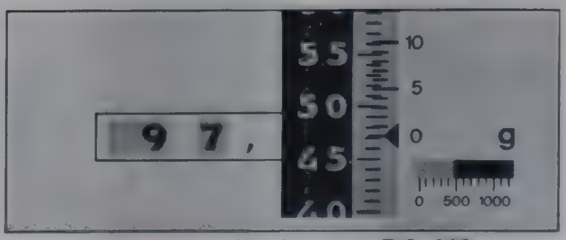
BA-610



Readout display on BA-604 to BA-614



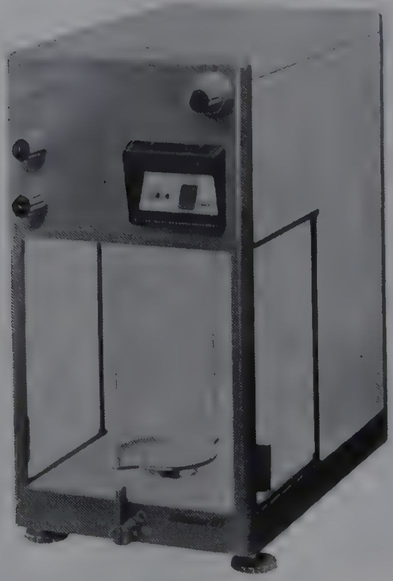
BA-660



Readout display on BA-660

All items on this page normally available from stock.

METTLER BALANCES

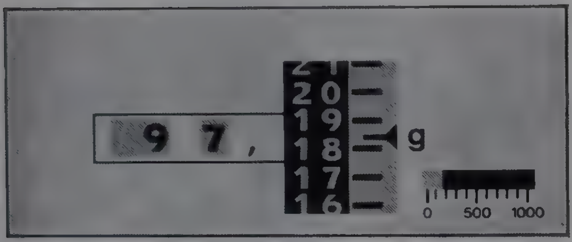


BA-690

ANALYTICAL

***BA-690**

BALANCE, analytical, *Mettler* H7.
Capacity **160 g.** Readability **2·0 mg.**
Precision ± 0·5 mg. Optical scale range 1250 mg with pointer readout. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. In two tone alloy housing.
Each **£132·00** *m*



Readout display on BA-690

ACCESSORY

BA-945 **Below Balance weighing attachment,** *Mettler* GD.
For details and price see entry in List No. sequence.

Mettler

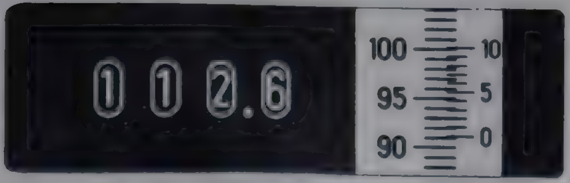
EXPLOSION PROOF BALANCES

All Model H balances can be supplied modified for use in flammable atmospheres. Details on request.

BA-720

***BA-720**

BALANCE, analytical, *Mettler* B5.
Capacity **200 g.** Readability **0·05 mg.**
Precision ±0·03 mg. Optical scale range 115 mg with vernier readout. Stainless steel pan diameter 100 mm, height of stirrup 160 mm. In green finished light alloy housing ... ... Each **£231·00** *m*



Readout display on BA-720

***BA-722**

BALANCE, analytical, *Mettler* B5 GD.
Capacity **200 g.** Readability **0·05 mg.**
As BA-720 but with removable attachment for weighing below the balance... ... ... Each **£246·00** *m*

All items on this page normally available from stock.

METTLER BALANCES

HIGH CAPACITY ANALYTICAL

***BA-730**

BALANCE, high capacity analytical, *Mettler* H1000.
Capacity **1000 g.** Readability **0·1 mg.**
Precision ±0·1 mg. Optical scale range 1000 mg, total weight displayed digitally. With built in taring system up to 1 g tare. Stainless steel pan diameter 135 mm, height of stirrup 190 mm. In two-tone aluminium alloy housing ... ... Each **£380·00** *mS*

***BA-732**

BALANCE, high capacity analytical, *Mettler* H1000 GD.
Capacity **1000 g.** Readability **0·05 mg.**
As BA-730 but with removable attachment for weighing below the balance... ... ... Each **£390·00** *mS*

BA-730

CARAT BALANCES

Mettler manufacture a range of balances for precious stone measurements. Details on request.

HEAVY DUTY ANALYTICAL

***BA-750**

BALANCE, heavy duty analytical, *Mettler* W5.
Capacity **5000 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 10,000 mg with vernier readout. Stainless steel pan diameter 200 mm, height of stirrup 320 mm. In grey finished light alloy housing.
Price on application. *m*

***BA-752**

BALANCE, heavy duty analytical, *Mettler* W5/11.
Capacity **5000 g.** Readability **1·0 mg.**
As BA-750 but with **remote control** box connected to the balance by cable ... ... Price on application. *m*

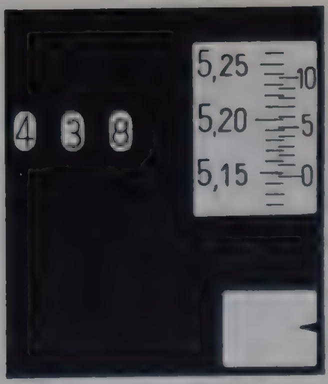
BA-750

***BA-754**

BALANCE, heavy duty analytical, *Mettler* W8.
Capacity **8000 g.** Readability **1·0 mg.**
Otherwise as BA-750 ... ... Price on application. *m*

***BA-756**

BALANCE, heavy duty analytical, *Mettler* W8/11.
Capacity **8000 g.** Readability **1·0 mg.**
Otherwise as BA-752, with **remote control.**
Price on application. *m*



Readout display on BA-750 and BA-752

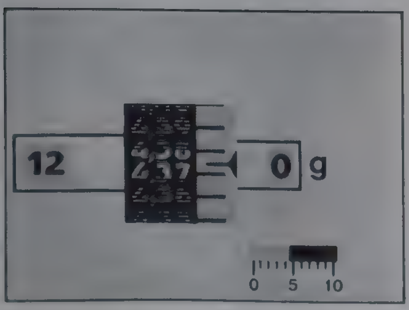
Items on this page coded S normally available from stock.

METTLER BALANCES

TOP LOADING

BA-808

BA-814



Readout display on BA-814

***BA-808**
BALANCE, precision, *Mettler* **P161,**
Capacity **160 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 10 g in divisions of 10 mg, total weight displayed digitally. In two-tone finished sheet steel housing ... ... Each **£155·00** *m*

***BA-810**
BALANCE, precision, *Mettler* **P160.**
Capacity **170 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 10 g in divisions of 10 mg, total weight displayed digitally. Incorporates complementary scale by which decreases in weight (e.g. as the result of drying) may be read digitally. With built-in taring system up to **10 g tare.** In two-tone finished sheet steel housing. ... ... Each **£205·00** *m*

***BA-812**
BALANCE, precision, *Mettler* **P160 N.**
Capacity **170 g.** Readability **1·0 mg.**
As BA-810 but with automatic compensation for errors caused by changes in balance level ... Each **£225·00** *m*

***BA-814**
BALANCE, precision, *Mettler* **P162.**
Capacity **170 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 10 g, total weight displayed digitally. With built-in taring system up to **10 g tare.** In two-tone finished sheet steel housing.
Each **£195·00** *m*

***BA-816**
BALANCE, precision, *Mettler* **P162N.**
Capacity **170 g.** Readability **1·0 mg.**
As BA-814 but with automatic compensation for errors caused by changes in balance level ... Each **£215·00** *m*

***BA-818**
BALANCE, precision, *Mettler* **P163.**
Capacity **170 g.** Readability **1·0 mg.**
Precision ±1·0 mg. Optical scale range 10 g in divisions of, total weight displayed digitally. With built-in taring system up to **10 g tare.** In two-tone finished sheet steel housing ... ... Each **£195·00** *m*

***BA-819**
BALANCE, precision, *Mettler* **P163 N.**
Capacity **170 g.** Readability **1·0 mg.**
As BA-818 but with automatic compensation for errors caused by changes in balance level ... Each **£215·00** *m*

ACCESSORY For BA-808 to BA-819
BA-948 **Infra-red dryer,** *Mettler* **LP12.** For details and price see entry in List No. sequence.

All items on this page normally available from stock.

METTLER BALANCES

TOP LOADING

***BA-820**

BALANCE, precision, *Mettler* P1200.
Capacity **1300 g.** Readability **0·01 g.**
Precision ±0·005 g. Optical scale range 100 g with total weight displayed digitally. With built-in taring system up to **100 g tare.** In two-tone finished sheet steel housing ... ... Each **£205·00** *m*

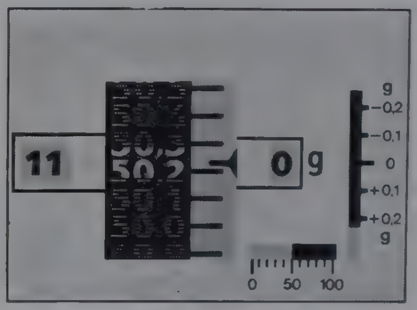
BA-820
BA-826

***BA-822**

BALANCE, precision, *Mettler* P1200 N.
Capacity **1300 g.** Readability **0·01 g.**
As BA-820 but with automatic compensation for errors caused by changes in balance level ... Each **£225·00** *m*

***BA-826**

BALANCE, precision, *Mettler* P1210.
Capacity **1300 g.** Readability **0·01 g.**
Precision ±0·005 g. Optical scale range 100 g in divisions of 1 g, total weight displayed digitally. With built-in taring system up to **100 g tare.** In two-tone finished sheet steel housing ... ... Each **£205·00** *m*



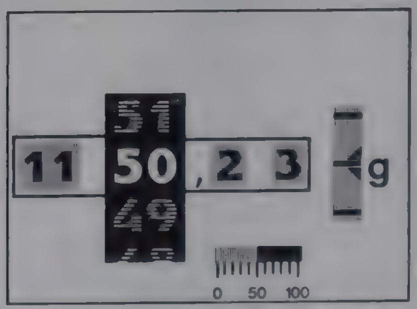
Readout display on BA-820 and BA-822

***BA-828**

BALANCE, precision, *Mettler* P1210 N.
Capacity **1300 g.** Readability **0·01 g.**
As BA-826 but with automatic compensation for errors caused by changes in balance level ... Each **£225·00** *m*

***BA-830**

BALANCE, precision, *Mettler* P1000.
Capacity **1300 g.** Readability **0·1 g.**
Precision ±0·05. Optical scale range 1000 g in divisions of 1 g, total weight displayed digitally. With built-in taring system up to **300 g tare.** In two-tone finished sheet steel housing ... ... Each **£186·00** *m*



Readout display on BA-826

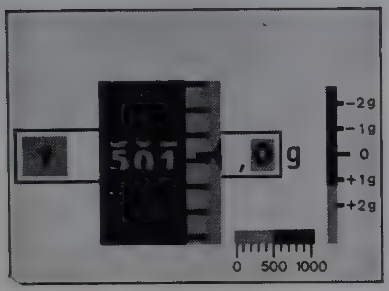
***BA-832**

BALANCE, precision, *Mettler* P1000 N.
Capacity **1300 g.** Readability **0·1 g.**
As BA-830 but with automatic compensation for errors caused by changes in balance level ... Each **£206·00** *m*

All items on this page normally available from stock.

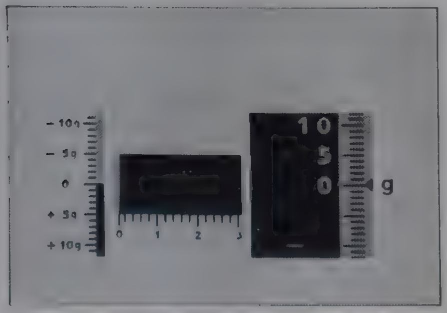
METTLER BALANCES

BA-840



Readout display on BA-840

BA-850



Readout display on BA-850

TOP LOADING

***BA-840**

BALANCE, precision, *Mettler* **P2000.**
Capacity **2500 g.** Readability **0·1 g.**
Precision ±0·05 g. Optical scale range 1000 g in divisions of 1 g, total weight displayed digitally. With built-in taring system up to **500 g tare.** In two-tone finished sheet steel housing ... ... Each **£205·00** *m*

***BA-842**

BALANCE, precision, *Mettler* **P2000 N.**
Capacity **2500 g.** Readability **0·1 g.**
As BA-840 but with automatic compensation for errors caused by changes in balance level ... Each **£225·00** *m*

***BA-850**

BALANCE, precision, *Mettler* **P3.**
Capacity **5000 g.** Readability **0·2 g.**
Precision ±0·05 g. Optical scale range 3000 g in divisions of 1 g. With built-in taring system up to **2000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing.
Each **£250·00** *m*

***BA-860**

BALANCE, precision, *Mettler* **P5.**
Capacity **6000 g.** Readability **0·1 g.**
Precision ±0·05 g. Optical scale range 500 g in divisions of 1 g, total weight displayed digitally. With built-in taring system up to **1000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... ... Each **£320·00** *m*

For illustration see opposite page.

NOTE: All *Mettler* P balances can be supplied as Board of Trade type approved. Details on request.

All items on this page normally available from stock.

METTLER BALANCES

TOP LOADING

***BA-870**

BALANCE, precision, *Mettler* P6.
Capacity **7500 g.** Readability **0·5 g.**
Precision ±0·25 g. Optical scale range 6000 g in divisions of 10 g, total weight displayed digitally. With built-in taring system up to **1500 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... Each **£290·00** *m*

BA-860
BA-880

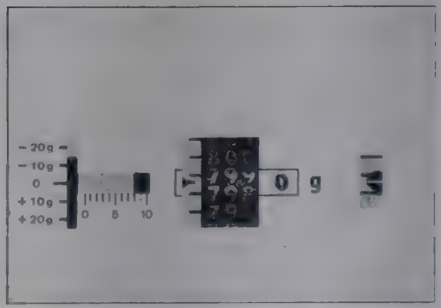
***BA-880**

BALANCE, precision, *Mettler* P11.
Capacity **11,000 g.** Readability **0·1 g.**
Precision ±0·05 g. Optical scale range 500 g in divisions of 1 g, total weight displayed digitally. With built-in taring system up to **1000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... Each **£355·00** *m*

BA-870
BA-890

***BA-890**

BALANCE, precision, *Mettler* P10.
Capacity **13,000 g.** Readability **1·0 g.**
Precision ±0·5 g. Optical scale range 10,000 g in divisions of 10 g, total weight displayed digitally. With built-in taring system for up to **3000 g tare** and automatic compensation for errors caused by changes in balance level. In two-tone finished sheet steel housing ... Each **£285·00** *m*



Readout display on BA-890

Mettler

EXPLOSION PROOF BALANCES

All Model P balances can be supplied modified for use in flammable atmospheres. Details on request.

All items on this page normally available from stock.

REPLACEMENT PARTS FOR METTLER BALANCES

LAMP BULBS

List No.	For balance type	Voltage	10	Each	
			£	£	
***BA-930**	B, M, K	6·5	**7·00**	**0·78**	*c*
***BA-932**	H3, H4, H5 H6, H15, H16	3	**5·80**	**0·64**	*c*
BA-935	H7, H8, H10, H14, H18, H20, all P range	6·5	**4·00**	**0·46**	*c*
***BA-936**	H10P, H20P	6	**7·60**	**0·84**	*c*

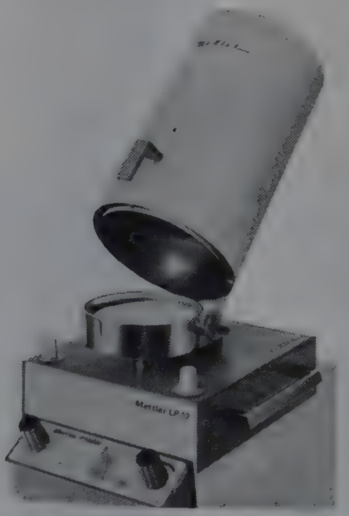
Gallenkamp

REGD TRADE MARK

MAINTENANCE SCHEME
FOR USERS IN THE UNITED KINGDOM

To ensure the continued high performance of your *Mettler* balance, we recommend that you have your balance registered under this scheme so that it may receive regular attention by skilled technicians. Only *Gallenkamp* offer this unique service by *Mettler* trained engineers.

ACCESSORIES FOR METTLER BALANCES



BA-948

***BA-945**

BELOW BALANCE WEIGHING ATTACHMENT, *Mettler* GD, for conversion of H7, H8, H10, H14, H18 and H20 analytical balances. Outfit comprising stirrup, base glass and cover and balance feet extensions. Each **£10·00** *m*

***BA-946**

BELOW BALANCE WEIGHING ATTACHMENT, *Mettler* GD, as BA-945 but for conversion of H10T, H10TW and H20T analytical balances ... ... Each **£10·00** *m*

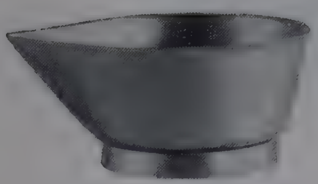
NOTE: Prices of BA-945 and BA-946 include fitting charge.

***BA-948**

INFRARED DRYER, *Mettler* LP12, for use with P160, P161, P162 and P163 precision top loading balances. Overall dimensions 250 × 280 × 335 mm, weight 4·5 kg. For 200/240V 50 Hz single phase supplies, power rating max. 170W... ... ... Each **£130·00** *m*

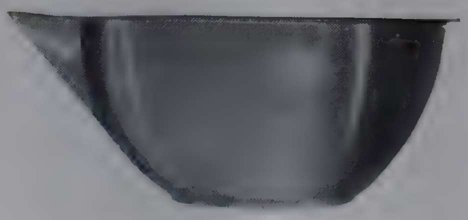
BALANCE PANS

Interchangeable pans for use with the *Mettler* P series precision balances. Pans for each particular balance have identical weights and can be freely interchanged with each other and with the pan supplied with the balance.



BA-950

BA-952



BA-954, BA-955, BA-956

List No.	For balance List No.	Material	Capacity ml	Dia-meter mm	Height mm	Each	
						£	
***BA-950**	BA-808 to BA-819	Stainless steel	180	92	40	**2·85**	*m*
***BA-952**	BA-820 to BA-842	Poly-propylene	1750	160	140	**3·10**	*m*
***BA-954**	BA-820 to BA-890	Stainless steel	1000	180	70	**6·90**	*m*
***BA-955**	BA-850 to BA-890	Stainless steel	2000	230	87	**10·00**	*m*
***BA-956**	BA-860 to BA-890	Stainless steel	5000	285	145	**12·00**	*m*

All items on this page normally available from stock.

ACCESSORIES FOR METTLER BALANCES

WINDSHIELD

***BA-960**

WINDSHIELD, *Mettler* LP 103, transparent, for use with P120, P160, P161, P162, P163, P1000, P1200, P1210 and P2000 top loading precision balances. Dimensions 170×170×170 mm ... ... Each **£8·60** *m*

LIGHT SHIELDS

***BA-970**

MAGNIFIER/LIGHT SHIELD, for use with model B5 balances. Comprises a light shield and a lens to magnify the optical scale, with bracket to fit into slot in balance case ... ... Each **£2·10** *m*

Note: The above item is included as standard equipment on M5 balances.

***BA-972**

MAGNIFIER/LIGHT SHIELD, as BA-970 but for use with H type balances ... ... Each **£1·50** *m*

WEIGHING ACCESSORIES

***BA-974**

WATCH GLASSES, tared to a predetermined weight with a tolerance of ±1 mg.

Weight	10	20 g	
Diameter	50	70 mm	
Each	**£1·15**	**1·30**	*m*

***BA-976**

WEIGHING SCOOPS, nickel, tared, as BA-974.

Weight	10	20 g	
Length	75	105 mm	
Width	25	35 mm	
Each	**£2·85**	**3·10**	*m*

***SJ-402**

VIBRO-SPATULA, *Mettler.* For price and details see entry in List No. sequence.

***BA-978**

WEIGHING BOATS, platinum, for use with ultra-micro balances.

For balance	UM7	UM6	
Weight	100	500 mg	
Each	**£3·90**	**19·25**	*m*

BA-970

BA-960 with BA-812

BA-976

WORKING COVERS

***BA-980**

WORKING COVER, plastics, for use with P160, P161, P162, P163, P1000, P1200, P1210 and P2000 top loading precision balances. This cover is fitted with a transparent window and a hole through which the pan projects. It is intended to protect the balance when in use in dusty locations ... ... Each **£0·95** *m*

***BA-982**

WORKING COVER, plastics, as BA-980 but for use with P3, P6 and P10 top loading precision balances. Each **£1·40** *m*

***BA-983**

WORKING COVER, plastics, as BA-890 but for use with P5 and P11 top loading precision balances. Each **£1·40** *m*

DUST COVER

***BA-988**

DUST COVER, plastics, for use with H7, H8, H10, H10T, H10TW, H10W, H20, H20E and H20T analytical balances ... ... Each **£1·20** *m*

All items on this page normally available from stock.

ANALYTICAL BALANCES

BB-620
BB-625

BB-620

BALANCE, analytical single pan, *Oertling* R10. Capacity **200 g.** Sensitivity **1·0 mg.** Optical scale range 1150 mg. Preweighing range 2 to 200 g. Taring range 100 g. Rectangular stainless steel pan 120×60 mm, height of stirrup 160 mm. 6V, 18W illumination supply from transformer suitable for 110/250V a.c. supplies. In aluminium alloy case with slide-up front. Each **£180·00** *f*

BB-625

BALANCE, analytical single pan, *Oertling* R20. Capacity **200 g.** Sensitivity **0·1 mg.** Optical scale range 115 mg. Preweighing range 1 to 200 g. Taring range 100 g. Rectangular stainless steel pan 120×60 mm, height of stirrup 160 mm. 6V, 18W illumination supply from transformer suitable for 110/250V a.c. supplies. In aluminium alloy case with slide-up front. Each **£198·00** *f*

BB-640
BB-645

BB-640

BALANCE, analytical single pan, *Stanton* CL4D. Capacity **200 g.** Sensitivity **0·1 mg.** Optical scale range 990 mg. Digital reading to 200 g without external weights. Rectangular stainless steel pan 100×75 mm, height of stirrup 175 mm. 6V, 18W illumination supply from tapped transformer suitable for 200/250V a.c. supplies. In aluminium alloy case with slide-up front ... ... Each **£180·00** *f*
110V model available to special order.

BB-645

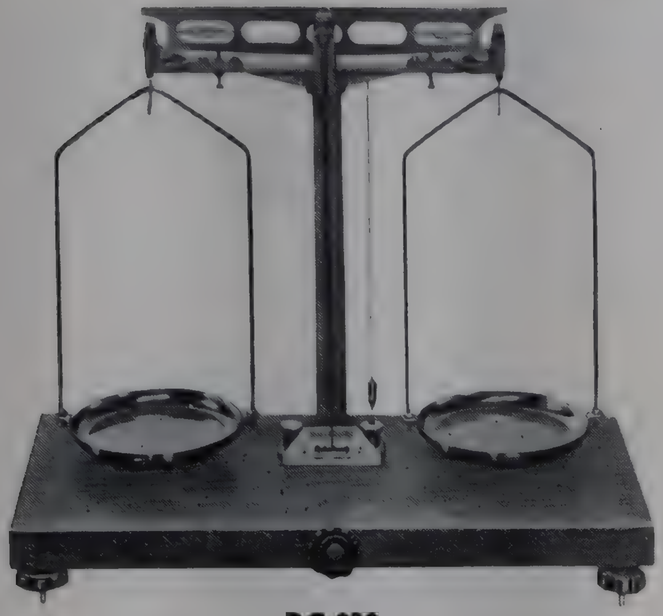
BALANCE, analytical single pan, *Stanton* CL5D. Capacity **100 g.** Sensitivity **0·01 mg.** Optical scale range 99 mg. Digital reading to 100 g without external weights. Rectangular stainless steel pan 100×75 mm, height of stirrup 175 mm. 6V, 18W illumination supply from tapped transformer suitable for 200/250V a.c. supplies. In aluminium alloy case with slide-up front ... ... Each **£220·00** *f*
110V model available to special order.

Gallenkamp **MANUFACTURE:**

Technico	**Volumetric Glassware** including: burettes, cylinders, density bottles, flasks, pipettes and viscometers.
	Benchblown Glassware including: condensers, fractionating columns, soxhlet extractors and stopcocks.
Sint-Glass	**Sintered Glassware** including: crucibles, filters, funnels, gas distributors and plates.

For suitable **Balance Weights, Forceps,** etc. see pages 54 and 55.

Gallenkamp STUDENT BALANCES



BC-030

BC-035 beam

- **Agate bearings throughout**
- **Large stainless steel pans**
- **Brass beams**
- **Baseboards and cases solid hardwood**

BC-030

BALANCE, student, *Gallenkamp.*
Capacity **250 g.** Sensitivity **2 mg.**
With long pointer and engraved ivorine scale, screwed feet and plumb line for levelling, brass beam with agate bearings, adjustments for balance, sensitivity and arrested beam position, front mounted beam arrestment knob and stainless steel pans diameter 100 mm, height of stirrup 200 mm ... ... Each **£12·50** *b*

BC-035

BALANCE, student, *Gallenkamp,* **twin rider.**
Capacity **250 g.** Sensitivity **2 mg.**
As BC-030 but with additional twin scaled beam mounted above the balance beam and carrying two captive riders. These riders may be adjusted with forceps and obviate the addition of weights of 1 g or less ... Each **£16·50** *b*

ACCESSORY

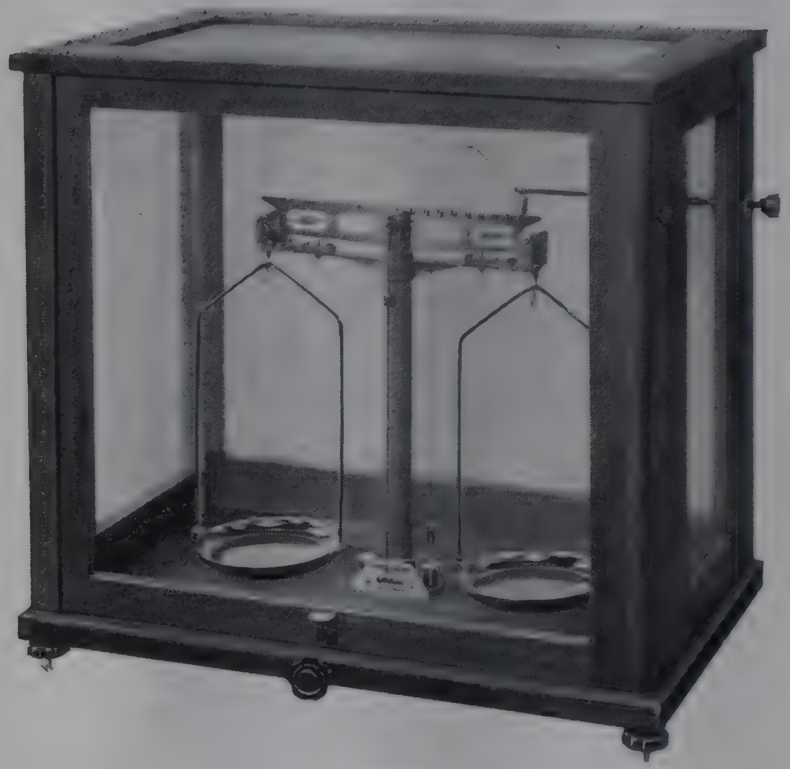
BC-038 **Balance case,** hardwood, fully glazed with slide-up front window. Suitable for balance BC-030 and BC-035. Internal dimensions, height 370 mm, width 395 mm, depth 208 mm ... ... Each **£5·20** *m*

BC-040

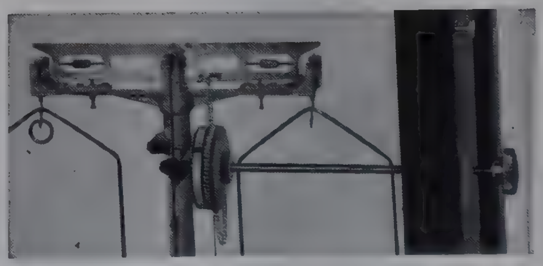
BALANCE, student, *Gallenkamp.*
Capacity **250 g.** Sensitivity **2 mg.**
As BC-030 but with draught excluding glazed case with slide-up front window and right-hand side manipulator for the beam rider. Complete with 100 mg rider. Each **£24·00** *b*

BC-045

BALANCE, student, *Gallenkamp.*
Capacity **250 g.** Sensitivity **2 mg.**
As BC-040 but with right-hand side control for Grainger chain drum. The chain drum is scaled from 0 to 1 g in 0·01 g subdivisions and enables weight in this range to be added by the progressive addition of the weight of a precision chain ... ... Each **£28·00** *b*



BC-040



BC-045 beam and
Grainger drum assembly

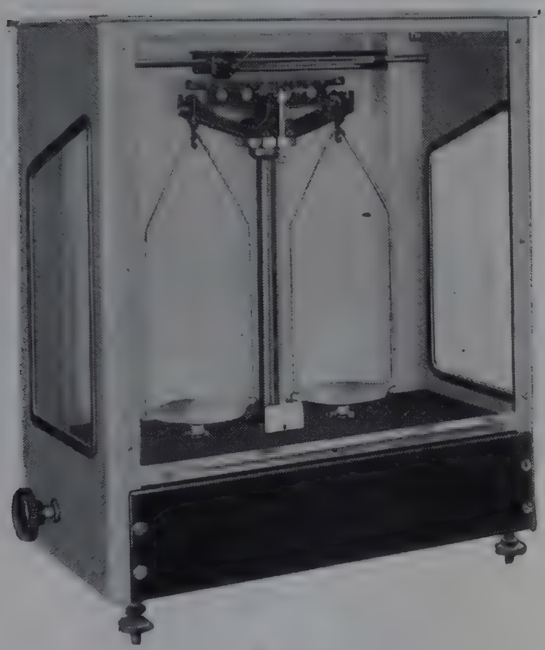
For suitable **Balance Weights, Forceps,** etc. see pages 54 and 55.

All items on this page normally available from stock.

STUDENT AND PRECISION BALANCES

BC-070

BC-076



BC-084

BC-088

BC-070

BALANCE, student, two pan.
Capacity **200 g.** Sensitivity **10 mg.**
Weighs to 1 g without external weights. Stainless steel pan diameter 100 mm, height of stirrup 125 mm. Totally enclosed beam with magnetic damping. Includes set of brass weights, 1 g to 100 g with forceps, in drawer below balance pans ... ... Each **£28·00** *fN*

BC-076

BALANCE, student, two pan, *Oertling* J10.
Capacity **250 g.** Sensitivity **5 mg.**
Weighs to 1 g without external weights. Stainless steel pan diameter 100 mm, height of stirrup 125 mm. Totally enclosed beam with oil damping. Includes set of brass weights, 1 g to 100 g with forceps, in drawer below balance pans ... ... Each **£32·00** *f*

BC-080

BALANCE, student analytical, two pan, *Stanton* C26.
Capacity **200 g.** Sensitivity **0·1 mg.**
Chromium plated brass pan diameter 100 mm, height of stirrup 220 mm. With brass beam having 100 graduations for the 5 mg rider supplied. In grey cellulosed plywood case with hinged side doors and slide-up front.
Each **£72·00** *f*

BC-084

BALANCE, student analytical, two pan, *Oertling* AO3.
Capacity **200 g.** Sensitivity **0·2 mg.**
Stainless steel pan diameter 90 mm, height of stirrup 200 mm. With brass beam having 100 graduations for the 5 mg rider supplied. In metal case with slide-up front.
Each **£85·00** *f*

BC-088

BALANCE, semi-automatic precision, *Oertling* 71.
Capacity **2 kg.** Sensitivity **0·1 g.**
Rectangular stainless steel weighing pan 200 × 180 mm, weighing height 22 cm. With 12 cm scale calibrated 0 to 10 g in 0·1 g divisions. Mounted on vitreous enamelled cast iron base ... ... Each **£75·00** *fN*

For suitable **Balance Weights, Forceps,** etc. see pages 54 and 55.

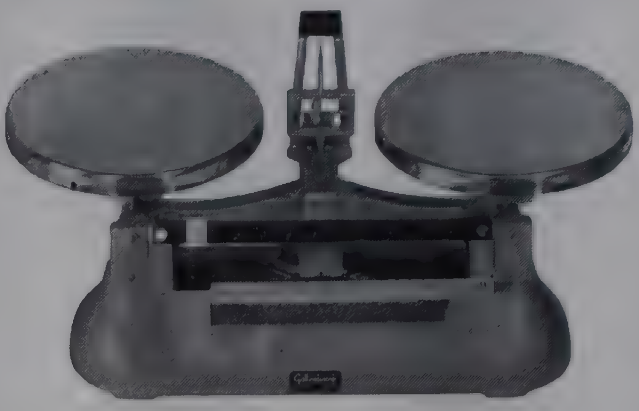
Items on this page normally available from stock except those coded *N*.

Gallenkamp SLIDING WEIGHT BALANCES

Strongly constructed beam balances, capacity 2 kg, sensitivity 0·1 g, fitted with two scales and the appropriate rider weights. One scale reads 0 to 10 g in 0·1 g and the other 0 to 200 g in 10 g. Weights are unnecessary for weighing up to 210 g.

List No.	Left-hand pan	Weight pan	Each	
			£	
BC-110	Stainless steel circular	Stainless steel circular	17·00	b
BC-111	Chromium plated scoop	Chromium plated circular	19·50	b
BC-112	Stainless steel scoop	Stainless steel circular	30·00	b

BC-115 **Set of weights,** for above balances, for weighing up to 2 kg, consisting of 100, 200, 500, and 1000 g weights in wood block ... ... Set £4·70 c



BC-110

BC-111
BC-112

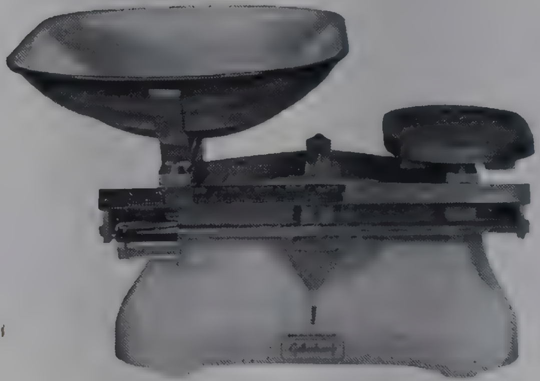
Gallenkamp ROTATING WEIGHT BALANCES

Strongly constructed beam balances, capacity 6 kg, sensitivity 0·5 g. Fitted with one scale 0 to 1000 g in 10 g and a rotating weight covering 0 to 10 g in 0·5 g divisions. Weights are unnecessary for weighing up to 1 kg. The rod carrying the rotating weight is threaded on the top only, allowing the weight to be moved rapidly along the scale by lifting slightly. With flat stove enamelled weight pan.

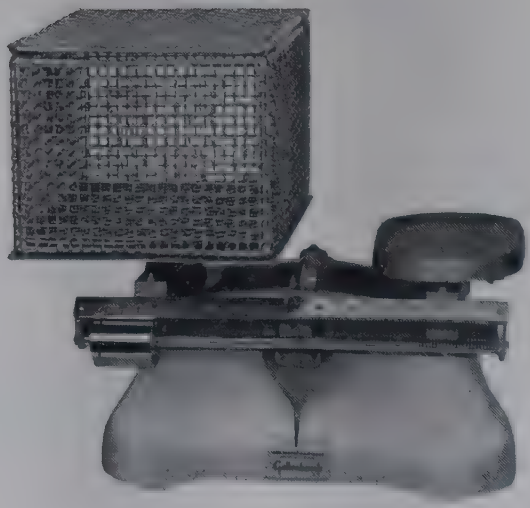
List No.	Left-hand pan		Each	
	Type	Dimensions		
			£	
BC-160	White porcelain flat	25 × 19 cm	22·00	b
BC-161	White enamelled iron scoop	38 × 25 × 6 cm	22·50	b
BC-163	Flat iron with animal cage	25 × 20 × 15 cm	27·50	b

BC-165 **Set of weights,** for above balances, for weighing up to 6 kg, comprising one 1 kg and two 2 kg iron weights. Set £1·75 c

NOTE. As sliding weight and rotating weight balances have a zero adjustment weight they do not comply with the Weights and Measures regulations and are not suitable for weighing for sale purposes in the United Kingdom.



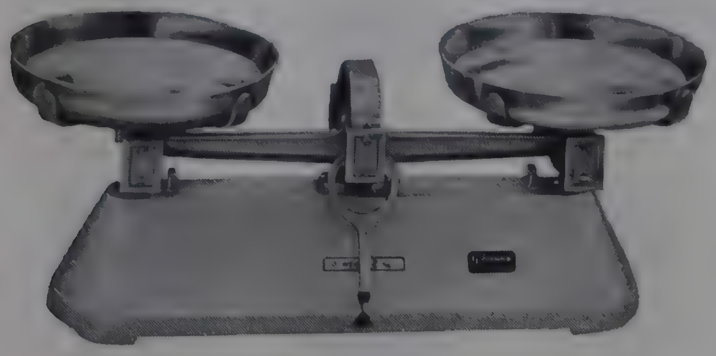
BC-161



BC-163

BALANCES,
Moisture see MOISTURE TESTING
Sedimentation see PARTICLE SIZE

All items on this page normally available from stock.



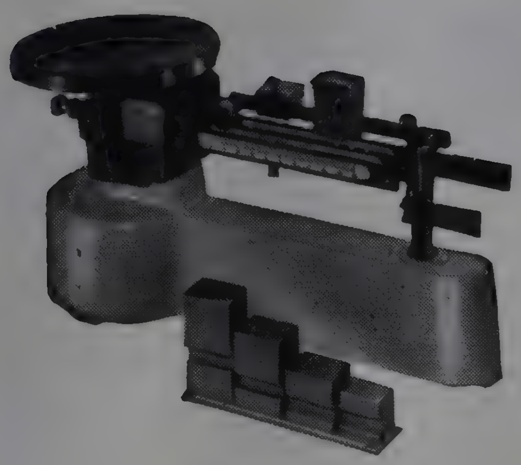
BC-170

BALANCE SCALES

BC-170

BALANCE SCALES, heavy duty. A soundly constructed beam balance mounted on heavy cast base with 225 mm dia. brass pans. The 2 and 5 kg models have single beam as illustrated. The 10 kg model has a double framed beam.

Capacity	2	5	10 kg	
Each	**£10·00**	**14·50**	**15·50**	*m*



BC-172
BC-174

BEAM BALANCES

BC-172

BALANCE, TRIPLE BEAM, with agate planes, steel knife edges and adjustable stops to limit beam movement. Capacity 1110 g extended to 2110 g by supplementary weight. Beams calibrated 0–10 g by 1 g, subdivided 0·1 g, 0–100 g by 10 g and 0–1000 g by 100 g. With 200 mm dia. plastics pan ... ... Each **£24·85** *m*

BC-174

BALANCE, TRIPLE BEAM, as BC-172 but capacity extended to 5110 g by use of four supplementary weights. Each **£28·00** *m*

BC-187

LEVER BALANCE

BC-187

BALANCE, lever pattern, rapid weighing with dual range arc scale graduated 0–250 g in 1 g divisions and 0–1000 g in 10 g divisions, edge reading index pointer and overload stop. Mounted on heavy base fitted with levelling screw. Complete with detachable aluminium pan 150 mm diameter, and a hook for specific gravity experiments. Overall dimensions: 38×30 cm. Weight 1·6 kg.
Nuffield Physics Approved Item 42 ... Each **£8·40** *m*

Gallenkamp

REGD. TRADE MARK

SEDIMENTATION BALANCE

For Particle Size Analysis

- Full range 5μ to 75μ in 6 hours
- Illuminated read-out
- Operates on 0·5 g of sample
- Optional auto-recording system

For full details see PC-650 et seq. in List No. sequence.

All items on this page normally available from stock.

TORSION BALANCES

These torsion balances are fitted with jewelled bearings, hardened steel pivots and magnetic damping. The scale of 500 divisions extends about 250° (310 mm) and is fitted with inset mirror to avoid parallax errors.

Standard model as illustrated has a tripod base and a hinged cover to protect the beam and hook. It is accurate to ±0·5%.

Precision model is fitted in an enamelled steel case with a hinged enclosure for shielding the sample during weighing and a lever to facilitate rapid repetition weighing of constant amounts. It is accurate to ±0·2%.

All ranges of both models have hooks for suspending specimens, the 5 mg range also has a 10 mm pan.

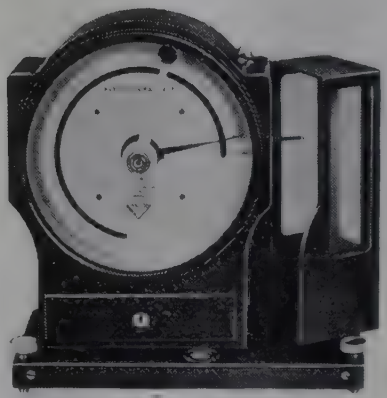
Range 0 to	Standard model		Precision model		Check weights	
	List No.	Each	List No.	Each	List No.	Set of 4
5 mg	**BC-190**	£ 39·00 *mN*	**BC-225**	£ 60·49 *mN*	**BC-250**	£ 2·50 *m*
50 mg	**BC-195**	36·73 *mN*	**BC-230**	58·30 *mN*	**BC-255**	2·50 *m*
500 mg	**BC-200**	36·73 *m*	**BC-235**	58·30 *mN*	**BC-260**	2·50 *m*
1000 mg	**BC-210**	36·73 *m*	**BC-240**	58·30 *mN*		
10 g	**BC-215**	36·73 *mN*	**BC-245**	58·30 *mN*	—	—

BC-190 to BC-215

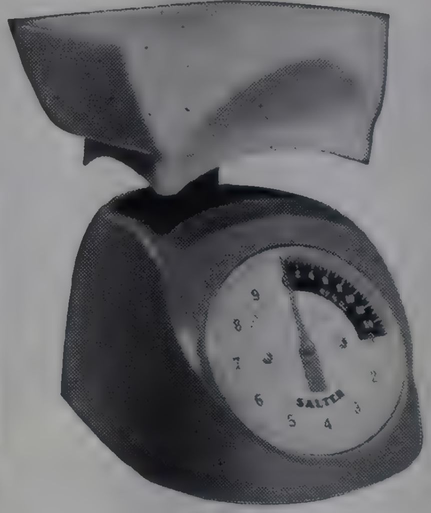
SPRING BALANCES

BC-490

BALANCE, spring, dual scale model in enamelled diecast case with taring adjustment and graduated plastics scoop. A double spring mechanism provides fine subdivisions in the lower range combined with a large capacity. The first section of the dial is divided every 5 g up to 1 kg when the second spring comes into action and the remainder of the dial is divided every 20 g up to a total capacity of 5 kg. *Salter* No. 51.
Each **£3·65** *m*



BC-225 to BC-245



BC-490
BC-492

BC-492

BALANCE, spring, dual scale as BC-490 but for Imperial system weighing. Scale divided in ¼ oz up to 1 lb and in 1 oz up to 10 lb ... ... Each **£3·97** *m*

BC-510

BALANCES, spring, in heavy metal case, with taring screw and circular tinned pan. *Salter* No. 50. Metric scale.

Capacity	10	20 kg
Divisions	50	50 g
Pan dia.	23	30 cm
Each	**£8·00**	**11·50** *m*

BC-530

BALANCES, spring, with hook. *Salter* No. 10. Metric scale.

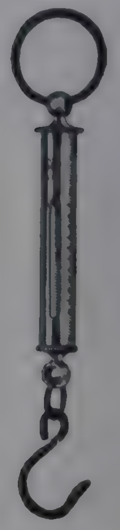
Capacity	100	200	500	1000 g
Divisions	1	2	5	10 g
Each	**£1·00**	**1·00**	**1·00**	**1·00** *m*

SALTER
10
1
2
3
4
5
6
7
8
9

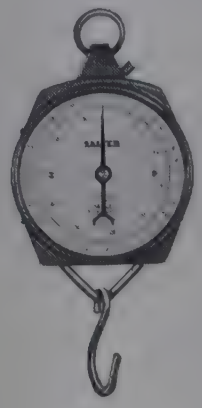
BC-510

BC-530

Items on this page normally available from stock except those coded *N*.



BC-570
BC-572



BC-590

SPRING BALANCES
(continued)

BC-570

BALANCES, spring, in tubular brass case with hook. *Salter* No. 15. Metric scale.

Capacity	5	10 kg	
Divisions	100	200 g	
Each	**£1·33**	**1·33**	*mS*

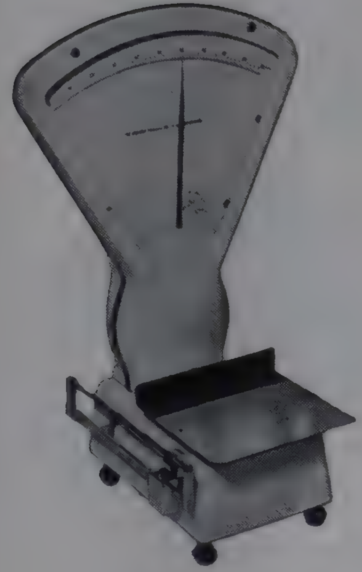
BC-572

BALANCES, spring, as BC-570 but Imperial scale.

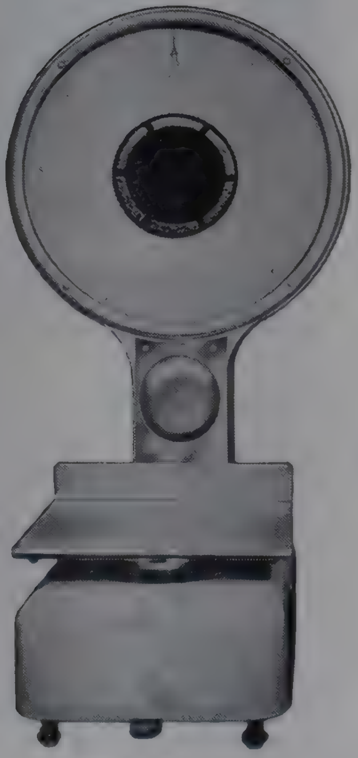
Capacity	4	10	20	40 lb	
Divisions	0·5 oz	0·1 lb	0·25 lb	0·5 lb	
Each	**£2·00**	**2·75**	**1·95**	**2·63**	*mS*

BC-590

BALANCE, spring, heavy duty dial suspension type in enamelled case with taring adjustment, ring and hook. White enamel scale 15 cm dia. divided in 250 g up to 50 kg. *Salter* No. 235 ... ... Each **£5·50** *mS*



BC-652
BC-654



BC-656
BC-658

HEAVY DUTY INDICATING BALANCES

BC-652

INDICATING BALANCE, heavy duty, sliding weight, range 0–2200 g, with chart reading 200×1 g. Fitted with tare beam for offsetting the weight of the container. Adjustable oil damping and adjustable levelling feet. Balance finished in white vitreous enamel with stainless steel plate 20×25 cm ... ... Each **£82·00** *m*

BC-654

INDICATING BALANCE, heavy duty, as BC-652 but range 0–5500 g, chart 500×2 g and plate 23×28 cm. Each **£109·00** *m*

The above balances are also available with double-lipped stainless steel scoop. Details on application.

BC-656

INDICATING BALANCE, heavy duty, complete range 0–10 kg on one chart subdivided in 20 g. Adjustable levelling feet. Balance finished in white vitreous enamel with stainless steel plate 25×37 cm. Each **£94·50** *m*

BC-658

INDICATING BALANCE, heavy duty, as BC-656 but range 0–20 kg subdivided in 50 g ... Each **£94·50** *m*

Items on this page coded *S* normally available from stock.

BD-120

BALANCE FEET, shock absorbing. Set of three feet each comprising moulded nylon top and base separated by a soft rubber buffer to minimise vibration.

10 sets **£9·00** Set **£1·00** *b*

BD-120

BD-180

BALANCE PLATFORM, *Gallenkamp*, **bench mounting.** Provides adequate protection for balances and other sensitive instruments by damping virtually all vibration. The balance platform is enclosed in a polished wood case and has a flush top surface of laminated plastics sheet on a heavy cast metal plate which is suspended from a system of shock absorbers.

Overall dimensions	57 × 41 × 9 cm
Balance platform	45 × 30 cm
Weight	30 kg

Each **£29·00** *b*

BD-180 with balance

BD-200

BALANCE TABLE, floor mounting, to provide a working surface which is free from the vibrations inherent in buildings. Ideal for mounting analytical balances, galvanometers, optical levers and other vibration sensitive instruments. The table comprises a set of stone slabs and a set of sundries. The top member and two side members (which are drilled to accept the bracing bar) are of 8 cm thick grey/green mottled terrazzo stone. The sundries comprise the bracing bar, washers and flanges, and a set of rubber shock-absorbing pads. Supplied with instructions for assembly.

Overall height	76 cm
Working surface	90 × 76 cm
Net weight approx.	300 kg

Each **£79·00** *m*

BD-200

BALANCE ACCESSORIES in other parts of the catalogue

Counterpoise bottles or tubes	see	TW-600 or TW-650
Desiccant capsule	see	DK-660
Lead shot for counterpoises	see	WT-220
Spatulas	see	SJ-050 et seq.
Watch glasses	see	BA-974
Weighing bottles	see	WT-020 et seq.
Weighing funnels	see	WT-170
Weighing scoops	see	BA-976, WT-150

All items on this page normally available from stock.

BALANCE WEIGHTS

TOLERANCES ON ADJUSTMENT

Analytical weights with tolerances as specified by the National Physical Laboratory are suitable for use with high class analytical balances. For many analytical purposes a slightly lower quality is acceptable and can be provided at a considerably lower cost in the form of *Gallenkamp* analytical weights. For student and precision balances *Gallenkamp* general purpose weights are suitable. The tolerances specified for these three grades of weights are shown in the table below.

DENOMINATION		1 mg	2 mg	5 mg	10 mg	20 mg	50 mg	100 mg	200 mg	500 mg	1 g	2 g	5 g	10 g	20 g	50 g	100 g	200 g	500 g	1000 g	2000 g	5000 g
NPL	± mg	0·02	0·02	0·02	0·02	0·02	0·02	0·05	0·05	0·05	0·05	0·05	0·05	0·05	0·1	0·25	0·5	1·0	—	—	—	—
Gallenkamp analytical	± mg	0·05	0·1	0·1	0·1	0·1	0·1	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·4	1·0	2·0	4·0	—	—	—	—
Gallenkamp general purpose	± mg	—	—	—	1	1	1	1	1	1	2	3	4	6	10	15	20	30	50	100	200	500

ANALYTICAL

BD-608

BALANCE WEIGHTS, ANALYTICAL, *Gallenkamp*, stainless steel with aluminium and nickel silver fractions. In plastics box with stainless steel forceps. Weights arranged on 1–2–2–5 system.

10 mg to	50	100 g	
Each	**£9·50**	**10·50**	*b*

BD-608

BD-609

BALANCE WEIGHTS, ANALYTICAL, *Gallenkamp*, stainless steel, as BD-608 but without fraction weights. For use with balances having mechanical fraction weight loading. In plastics box with stainless steel forceps. 1 g to 100 g arranged on 1–2–2–5 system.

Each **£9·50** *b*

BD-620

BD-614

BALANCE RIDER, ANALYTICAL, *Gallenkamp*, platinum wire. Weight 10 mg.

Ten **£3·00** Each **£0·36** *b*

BD-620

BALANCE WEIGHTS, ANALYTICAL, *Oertling* WO2, stainless steel. In two tone plastics case, with stainless steel strip fractions and plastics forceps. With works certificate. 10 mg to 100 g arranged on 1–1–2–5 system ... ... Each **£21·00** *f*

BD-624

BD-624

BALANCE WEIGHTS, ANALYTICAL, *Stanton* SS8, stainless steel. In polished mahogany box lined with velvet, with tipped forceps and glass cover over stainless steel fractions. Weights are checked to within NPL tolerances, and a works certificate is supplied with each set. 10 mg to 100 g arranged on 1–2–3–5 system.

Each **£21·00** *fN*

Items on this page normally available from stock except those coded *N*.

BALANCE WEIGHTS

GENERAL PURPOSE

Tolerances see table on page 54.

BD-650

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass with aluminium and nickel-silver fractions. Set of weights arranged on 1–2–2–5 system in ivory plastics box with forceps.

1 mg to	100	200 g	
10 sets	**£31·00**	**40·00**	*b*
Set	**£ 3·40**	**4·50**	

BD-650

BD-660

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass. Set of weights without fractions arranged on 1–2–2–5 system, in polished hardwood box.

1 g to	500	1000	2000	5000 g	
Set	**£6·50**	**9·50**	**13·25**	**35·00**	*b*

BD-670

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass. Loose weights as used in sets BD-650 and BD-660.

Weight	1	2	5	10	20	50	100 g	
Ten	**£0·50**	**0·60**	**0·74**	**0·96**	**1·25**	**2·25**	**3·80**	*b*
Each	**£0·13**	**0·13**	**0·15**	**0·17**	**0·20**	**0·29**	**0·44**	

Weight	200	500	1000	2000	5000 g	
Ten	**£7·40**	**12·40**	**24·00**	**45·00**	—	*b*
Each	**£0·82**	**1·40**	**2·70**	**5·00**	**10·50**	

BD-660

BD-672

BALANCE WEIGHTS, fractions, *Gallenkamp*, general purpose. Loose fraction, 1 mg to 5 mg aluminium and 10 mg to 500 mg nickel-silver, as used in sets BD-650. In packs of 10.

Weight	1	2	5	10	20 mg	
10 packs	**£3·60**	**3·60**	**3·60**	**3·60**	**3·60**	*b*
Pack	**£0·42**	**0·42**	**0·42**	**0·42**	**0·42**	

Weight	50	100	200	500 mg	
10 packs	**£3·60**	**4·80**	**4·80**	**4·80**	*b*
Pack	**£0·42**	**0·53**	**0·53**	**0·53**	

BD-690

BD-680

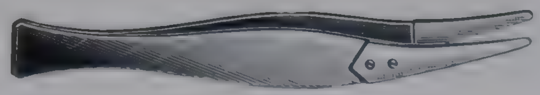
BALANCE WEIGHTS, fractions, *Gallenkamp*, general purpose. 10–500 mg nickel-silver fractions with 10 and 100 mg in duplicate, in box with hinged lid.

Ten **£6·40** Each **£0·70** *b*

ACCESSORIES

BD-690 **BALANCE WEIGHT FORCEPS,** nickel plated brass, with curved ends, length 9 cm.
Ten **£0·90** Each **£0·16** c

BD-692 **BALANCE WEIGHT FORCEPS,** stainless steel, with curved ivory tips, length 9 cm.
Ten **£13·00** Each **£1·45** c



BD-692

All items on this page normally available from stock.

BE-350

BE-380

BE-350

BAROMETER, direct reading, *Darton*, with compensated silvered metal scales on metal reflector, and thermometer. Mounted on polished board.

Each **£19·00** *m*

BE-380

BAROMETER, Fortin, *Darton*, designed for school and college laboratories, suitable also for amateur meteorologists. With silvered metal scales, range 26–32 in and 660–810 mm, on black enamelled square frame with opal reflector and thermometer graduated in °C, mounted on polished board. Vernier reading to 0·002 in and 0·05 mm. Bore of tube 7 mm nominal .. Each **£43·50** *m*

Suitable case see BE-410.

BE-400

BAROMETERS, Fortin, *Darton*, with engine divided scales to 0·05 in and 1 mm. Scale reading range 26·5 in to 32·5 in and 675–820 mm. Vernier readings to 0·002 in and 0·05 mm, complete with attached thermometer graduated in °C, on polished board, with reflector.

Bore of tube (nominal)	7	8	13 mm	
Each	**£51·50**	**82·50**	**102·50**	*m*

BE-410

BAROMETER CASES, polished hardwood, with glass side panels and front-opening door. For barometers BE-380 and BE-400.

Bore of tube	7	8	13 mm	
Each	**£12·25**	**13·00**	**13·25**	*m*

BE-400

BE-410

Barometers BE-380, BE-400 and BE-430 are graduated in accordance with the standard conventions detailed in British Standard 2520.

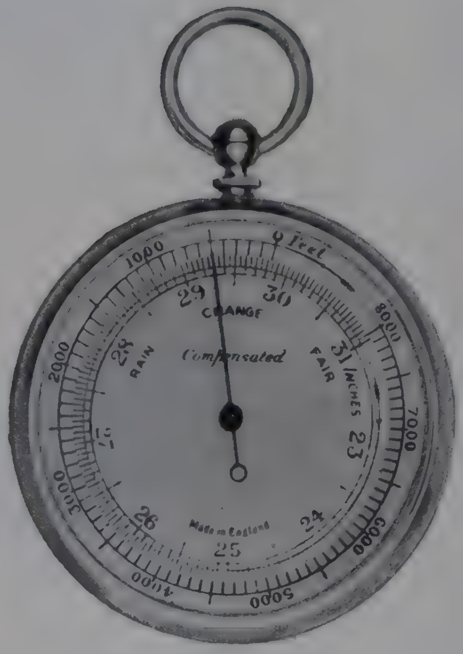
All items on this page normally available from stock.

BE-430

BAROMETER, Standard Station, Kew type, *Darton* (Board of Trade pattern), scale range 26·5–32·5 in and 675–820 mm, with Vernier reading to 0·002 in, 0·05 mm. Complete with attached thermometer reading in °C and short arm and gimbal suspension. Bore of tube 6 mm ... ... Each **£64·00** *m*

BE-430

SPECIAL NOTICE—Mercury barometers are liable to damage in transit. Whenever possible we deliver in our own vans and accept all responsibility. When this is not possible we take all reasonable precautions and advise sending by passenger train 'in care of the guard', suitably insured, and for customer to meet the train on arrival. For export, we recommend 'special stowage', hung in officer's cabin.



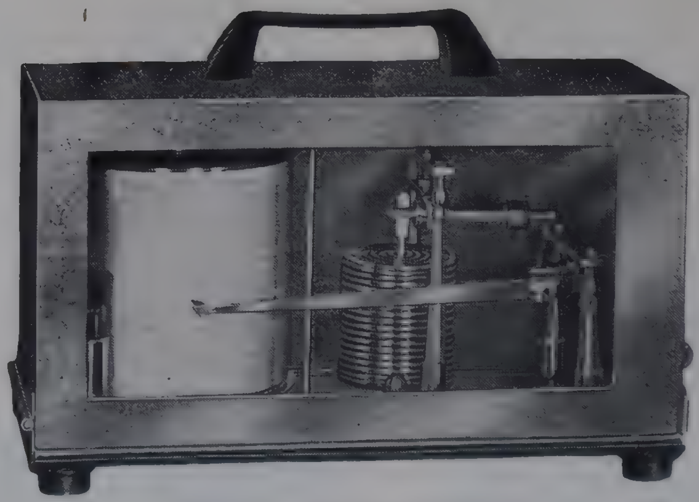
BE-450

BE-450

BAROMETER, aneroid, watch form, with 4 cm dial scaled 23 to 31 inches in 0·05 inch divisions, and revolving altitude scale to 8000 ft in 100 ft divisions.
Each **£15·50** *cS*

BE-500

BAROGRAPH, *Darton*, with seven vacuum capsule movement and recording drum operated by 7-day clock for weekly recording. In heavy copper hinged case with glass window mounted on cast base. Complete with bottle of ink and 52 charts scaled 7 days, 950–1050 mb.
Each **£57·94** *m*



BE-500

BE-520

BAROTHERMOGRAPH, *Darton*, for recording pressure and temperature on the same chart. This instrument has a similar barometer movement to BE-500, with the addition of a bimetallic temperature recording element. With clockwork movement for 7-day charts. Complete with two bottles of ink and 52 charts scaled 7 days, 20–120°F and 950–1050 mb ... ... Each **£59·25** *m*

THERMOGRAPHS see **TK-100** et seq. in List No. sequence.

Items on this page coded *S* normally available from stock.

GLASS BASINS

BH-030

BASINS, evaporating, *Pyrex brand* glass, round bottom with spout.

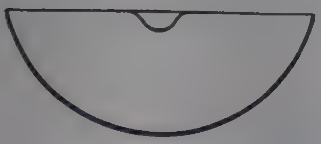
Capacity approx.	40	75	100	250 ml	
Diameter	65	78	90	120 mm	
Depth	30	40	45	60 mm	
Std. pack qty.	36	36	36	18	
Std. pack	**£6·15**	**7·10**	**7·30**	**4·55**	*d*
Each	**£0·25**	**0·28**	**0·28**	**0·33**	

BH-040

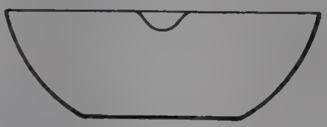
BASINS, evaporating, *Pyrex brand* glass, flat bottom with spout.

Capacity approx.	25	100	150	200 ml	
Diameter	60	80	90	105 mm	
Depth	25	45	50	55 mm	
Std. pack qty.	36	72	72	48	
Std. pack	**£6·15**	**14·60**	**15·20**	**10·60**	*d*
Dozen	**£2·20**	**2·65**	**2·80**	**2·85**	
Each	**£0·25**	**0·29**	**0·30**	**0·30**	

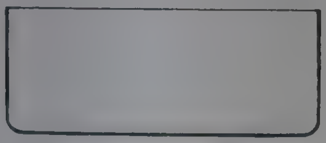
Capacity approx.	350	700	1500 ml	
Diameter	125	150	200 mm	
Depth	65	80	100 mm	
Std. pack qty	36	24	18	
Std. pack	**£10·70**	**10·05**	**12·55**	*d*
Each	**£ 0·38**	**0·49**	**0·80**	



BH-030

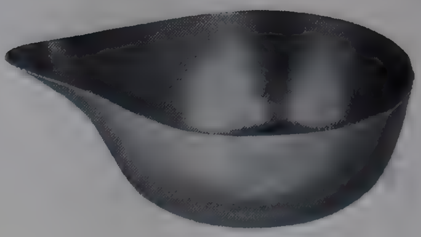


BH-040



BH-070

BH-185



BH-205

BH-070

BASINS, crystallising, *Pyrex brand* glass, flat bottom, without spout.

Capacity approx.	150	175	250	375 ml	
Diameter	70	80	94	102 mm	
Depth	50	40	50	50 mm	
Std. pack qty	24	24	18	18	
Std. pack	**£3·90**	**4·85**	**3·70**	**3·95**	*d*
Each	**£0·24**	**0·28**	**0·28**	**0·29**	

Capacity approx.	650	1200	1850	2500 ml	
Diameter	125	150	170	190 mm	
Depth	65	75	90	100 mm	
Std. pack qty	12	8	8	6	
Std. pack	**£3·55**	**3·35**	**4·95**	**4·25**	*d*
Each	**£0·36**	**0·47**	**0·68**	**0·78**	

METAL BASINS

BH-185

BASINS, aluminium, with well-fitting lid, for the determination of moisture in coal as specified in BS 1016 Part 1.

Capacity approx.	13	45 ml	
Diameter	35	65 mm	
Depth	14	14 mm	
Ten	**£2·90**	**3·40**	c
Each	**£0·35**	**0·40**	

BH-205

BASIN, nickel, with large spout, 75 mm diameter, 35 mm deep. Capacity approx. 100 ml.

Ten **£11·80** Each **£1·30** *m*

BH-220

BASINS, nickel, flat form, without spout, for milk analysis, etc.

Capacity approx.	45	70	170 ml	
Diameter	55	70	85 mm	
Depth	19	19	30 mm	
Ten	**£4·10**	**4·90**	**7·20**	*m*
Each	**£0·46**	**0·54**	**0·80**	

For illustration see opposite page.

All items on this page normally available from stock.

METAL BASINS

(continued)

BH-230

BASINS, nickel, flat form, with drop-on cover with knob.

Capacity approx.	45	100 ml	
Diameter	60	90 mm	
Depth	16	16 mm	
Ten	**£8·00**	**12·20**	*m*
Each	**£0·88**	**1·35**	

BH-260

BASINS, platinum, with spout, dimensions nominal.

Capacity	35	50	100 ml	
Diameter	50	53	70 mm	
Approx. weight	14	18	37 g	
Each	**£45·00**	**57·00**	**115·00**	*fN*

BH-280

BASIN, stainless steel, polished, for milk analysis, 70 mm dia. 15 mm deep. Capacity approx. 55 ml.

Ten **£6·00** Each **£0·66** c

BH-285

BASIN, stainless steel, polished, for condensed milk analysis, 85 mm dia., 22 mm high, with drop-in lid, with projecting handle at one side. Capacity approx. 120 ml.

Ten **£9·60** Each **£1·06** c

PLASTICS BASINS

BH-345

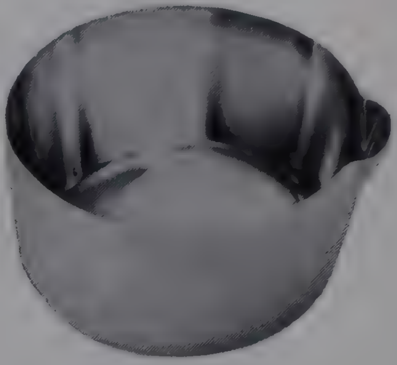
BASINS, polypropylene, without spout.

Capacity approx.	200	700	1500	3000 ml	
Diameter	100	150	200	250 mm	
Ten	**£1·40**	**2·25**	**4·00**	**5·80**	c
Each	**£0·21**	**0·29**	**0·45**	**0·64**	

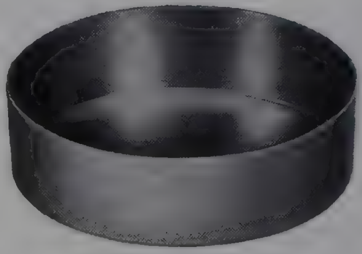
BASINS, special purpose, will be found under the following headings

Ignition capsules	see	DISHES
Petri dishes	see	CULTURE
Sand bath dishes	see	SAND BATHS

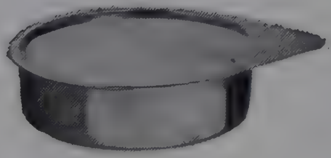
BH-230



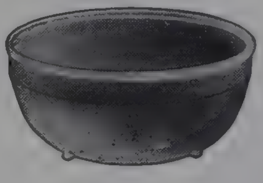
BH-260



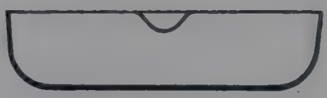
BH-220
BH-280



BH-285



BH-345



BH-400

PORCELAIN BASINS

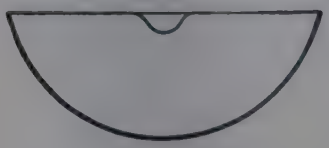
BH-400

BASINS, evaporating, *Royal Worcester* porcelain, flat form, with lip, glazed inside and out.

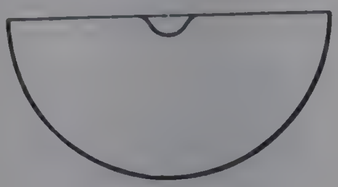
No.	1	2	2b	
Capacity	50	75	100 ml	
Diameter	75	85	95 mm	
Ten	**£1·95**	**2·35**	**3·20**	*d*
Each	**£0·26**	**0·30**	**0·38**	
No.	3	5	6	
Capacity	140	300	450 ml	
Diameter	100	125	147 mm	
Ten	**£3·65**	**5·15**	**6·65**	*d*
Each	**£0·42**	**0·57**	**0·74**	

Items on this page normally available from stock except those coded *N.*

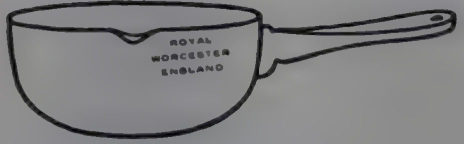
PORCELAIN BASINS
(continued)



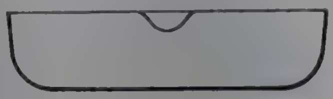
BH-420
BH-510



BH-430
BH-521



BH-460



BH-500

BH-420

BASINS, evaporating, *Royal Worcester* porcelain, shallow form, with lip, sizes up to and including No. 5 glazed inside and out, other sizes unglazed on lower portion outside.

No.	00	0	1	2	3	
Capacity	75	85	125	150	225 ml	
Diameter	75	85	90	95	109 mm	
Ten	**£1·65**	**2·05**	**2·30**	**2·90**	**3·40**	*d*
Each	**£0·24**	**0·27**	**0·29**	**0·35**	**0·40**	

No.	4	5	6	6b	
Capacity	250	375	550	850 ml	
Diameter	115	127	157	178 mm	
Ten	**£3·90**	**5·00**	**5·95**	**8·55**	*d*
Each	**£0·45**	**0·56**	**0·66**	**0·96**	

No.	7	8	8a	9	
Capacity	1100	1600	1900	3000 ml	
Diameter	200	225	245	280 mm	
Ten	**£9·80**	**14·90**	**16·20**	**22·00**	*d*
Each	**£1·10**	**1·65**	**1·80**	**2·45**	

BATHS

Embedding	see	HISTOLOGY
Extraction	see	EXTRACTION APPARATUS
Germination	see	SEED TESTING
Oil	see	OIL BATHS
Refrigerated	see	WATER BATHS
Sand	see	SAND BATHS
Thermostatic Water	see	WATER BATHS
Viscometer	see	VISCOMETERS

BH-430

BASINS, evaporating, *Royal Worcester* porcelain, deep form, with lip, glazed inside and out.

No.	5/0	4/0	3/0	00	00a	
Capacity	13	50	75	175	250 ml	
Diameter	42	63	73	95	100 mm	
Ten	**£1·00**	**1·20**	**1·70**	**2·65**	**3·45**	*d*
Each	**£0·17**	**0·19**	**0·24**	**0·33**	**0·40**	

No.	0	1	2	3	
Capacity	350	650	1200	1700 ml	
Diameter	105	150	185	200 mm	
Ten	**£4·15**	**5·85**	**8·00**	**10·40**	*d*
Each	**£0·47**	**0·66**	**0·85**	**1·16**	

BH-460

BASINS, with handle (casseroles) *Royal Worcester* porcelain, with lip.

No.	2	3	4	5	
Capacity	80	175	400	700 ml	
Diameter	70	90	115	140 mm	
Ten	**£4·15**	**5·75**	**9·55**	**12·70**	*d*
Each	**£0·47**	**0·64**	**1·06**	**1·40**	

SILICA BASINS

BH-500

BASINS, evaporating, *Vitreosil*, translucent fused silica, flat form, glazed, with spout.

No.	F1	F2	F5	F3	F4	
Capacity	20	25	60	75	125 ml	
Diameter	69	78	94	100	130 mm	
Height	15	15	24	20	23 mm	
Ten	**£8·25**	**8·70**	**9·60**	**10·65**	**14·65**	*m*
Each	**£0·92**	**0·98**	**1·08**	**1·20**	**1·65**	

BH-510

BASINS, evaporating, *Vitreosil*, translucent fused silica, shallow form, glazed, with spout.

No.	B1	B3	B5	B9	B10	
Capacity	20	45	70	100	200 ml	
Diameter	55	75	87	100	113 mm	
Height	23	27	33	38	47 mm	
Ten	**£7·15**	**8·25**	**8·70**	**11·55**	**13·30**	*m*
Each	**£0·80**	**0·92**	**0·98**	**1·30**	**1·50**	

BH-521

BASINS, evaporating, *Vitreosil*, translucent fused silica, deep form, glazed inside only, with spout.

No.	B11	B12	B17	
Capacity	400	500	800 ml	
Diameter	142	137	187 mm	
Height	62	66	70 mm	
Ten	**£31·00**	**34·00**	**44·00**	*m*
Each	**£ 3·50**	**3·80**	**4·90**	

All items on this page normally available from stock.

BATTERIES

(Accumulators, secondary cells)

BATTERIES, *Exide* multi-plate type. Single 2V cells in glass containers, supplied dry and uncharged. BJ-164 and BJ-166 are fitted with loose carrying handles.

List No.	Type	A.h. capacity at 20 h rate	Overall dimensions mm			Each	
			W.	L.	H.		
BJ-160	LCG2	20	127	60	203	**£ 2·20**	*m*
BJ-162	LCG4	40	127	90	203	**3·05**	*m*
BJ-164	LCG6	60	127	125	203	**3·95**	*m*
BJ-166	LCG8	80	127	154	203	**4·95**	*m*

BJ-160 to BJ-166

BATTERIES, *Mallory* **voltage reference, see EF-490 in List No. sequence**

BJ-240

BATTERY CHARGERS

BJ-240

BATTERY CHARGER for 6 and 12V batteries, charging at 1·5A max. Comprising transformer, selenium rectifier and clear scale ammeter housed in a louvred steel case designed for wall and bench mounting. Supplied with connecting leads and clips. For 200/250V 50 Hz single phase supplies ... ... Each **£4·25** *m*

BJ-250

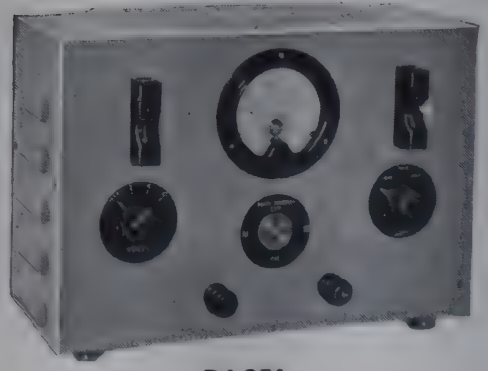
BJ-250

BATTERY CHARGER, as BJ-240, but charging at up to 5A ... ... Each **£7·95** *m*

BJ-256

BATTERY CHARGER, for 2V, 6V and 12V batteries charging at 1 to 5A. Comprising transformer, rectifier, fuses and ammeter in a metal case, complete with mains input cable and shrouded output terminals. Overall dimensions 20 × 28 × 18 cm. Net weight 6 kg. For 200/250V 50 Hz single phase supplies.

Each **£14·60** *m*


BJ-256

All items on this page normally available from stock.

BJ-620
BJ-625

BJ-650 to BJ-670

TALL FORM BEAKERS

BJ-620

BEAKERS, tall form, without spout, *Firmasil* glass.

Capacity	50	100	250 ml	
Ten	£1·05	1·05	1·29	*d*
Each	£0·18	0·18	0·20	

Capacity	400	600	1000 ml	
Ten	£1·48	1·86	2·58	*d*
Each	£0·22	0·25	0·32	

BJ-625

BEAKERS, tall form, without spout, *Pyrex brand* glass, with three or more graduations showing approximate capacities.

Capacity	50	100	150	250	400 ml	
Std. pack qty.	144	96	96	72	72	
Std. pack	£15·55	11·65	12·95	10·70	12·65	*d*
Dozen	£ 1·45	1·60	1·75	1·95	2·30	
Each	£ 0·19	0·21	0·22	0·23	0·26	

Capacity	600	1000	2000 ml	
Std. pack qty.	72	36	12	
Std. pack	£15·55	12·00	7·40	*d*
Six	£ 1·45	—	—	
Each	£ 0·30	0·41	0·70	

MK-050

BEAKERS, micro. For details and prices see entry in List No. sequence.

SQUAT FORM BEAKERS

BJ-650

BEAKERS, squat form, with spout, *Firmasil* glass.

Capacity	25	50	100	150	250 ml	
Ten	£1·05	1·05	1·05	1·29	1·29	*d*
Each	£0·18	0·18	0·18	0·20	0·20	

Capacity	400	600	1000	2000	3000 ml	
Ten	£1·48	1·86	2·58	5·05	7·91	*d*
Each	£0·22	0·25	0·32	0·56	0·88	

BJ-655

BEAKERS, squat form, with spout, *Pyrex brand* glass. with two or more graduations showing approximate capacities.

Capacity	50	100	150	250	400 ml	
Std. pack qty.	144	120	96	96	60	
Std. pack	£15·55	14·60	12·95	14·25	10·55	*d*
Dozen	£ 1·45	1·65	1·80	1·95	2·30	
Each	£ 0·19	0·21	0·22	0·23	0·26	

Capacity	500	600	800	1000	1500 ml	
Std. pack qty.	60	60	48	36	24	
Std. pack	£11·05	12·70	12·75	12·00	10·70	*d*
Six	£ 1·25	1·40	1·75	—	—	
Each	£ 0·27	0·29	0·35	0·41	0·52	

Capacity	2000	3000	4000	5000 ml	
Std. pack qty.	12	12	12	6	
Std. pack	£7·40	10·95	13·75	8·00	*d*
Each	£0·70	1·02	1·30	1·45	

BJ-670

BEAKERS, squat form, with spout, *Vitreosil* translucent fused silica. Capacity 250 ml.

Ten **£26·15** Each **£2·92** *mN*

MK-055

BEAKERS, micro. For details and prices see entry in List No. sequence.

BRUSHES for cleaning beakers. For details see BU-430 and BU-434 in List No. sequence.

HEATERS for squat form beakers. For details see HD-752 to HD-760 in List No. sequence.

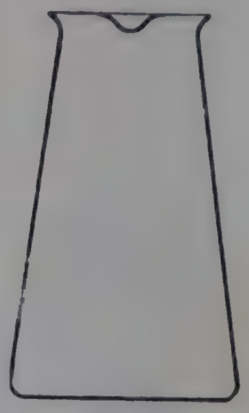
Items on this page normally available from stock except those coded *N*.

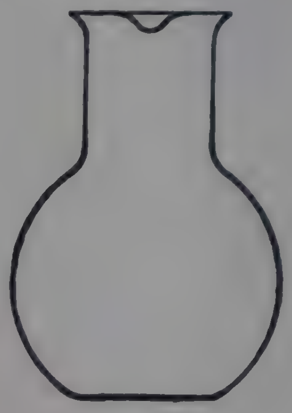
MISCELLANEOUS BEAKERS

BJ-695

BEAKERS, conical form, wide mouth, with spout, *Pyrex brand* glass.

Capacity	125	250	300	400 ml	
Std. pack qty.	96	72	72	72	
Std. pack	**£16·40**	**14·25**	**14·60**	**15·25**	*d*
Dozen	**£ 2·25**	**2·60**	**2·65**	**2·75**	
Each	**£ 0·25**	**0·28**	**0·29**	**0·29**	
Capacity	500	650	800	1000 ml	
Std. pack qty.	60	48	48	36	
Std. pack	**£15·95**	**15·10**	**17·05**	**14·40**	*d*
Six	**£ 1·80**	**2·10**	**2·35**	—	
Each	**£ 0·35**	**0·40**	**0·44**	**0·47**	

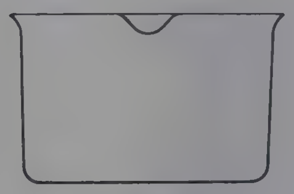

BJ-695


BJ-725

BJ-725

BEAKER FLASKS, with spout, *Pyrex brand* glass.

Capacity	200	400	500 ml	
Std. pack qty.	36	36	36	
Std. pack	**£7·30**	**9·40**	**10·35**	*d*
Each	**£0·28**	**0·34**	**0·36**	


BJ-740

BJ-740

BEAKERS, Baco, squat form, with spout, *Pyrex brand* glass, 460 ml capacity.

Std. pack of 24 **£7·55** Each **£0·38** *d*

TONGS for handling beakers. For details see TS-250, TS-260 and TS-262 in List No. sequence.

QUANTITY DISCOUNTS for glassware in bulk quantities, see details under 'Conditions of Sale'.

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Most British Standards prepared or revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓐ or *Asda* can be relied upon to provide the highest quality at an economic price.

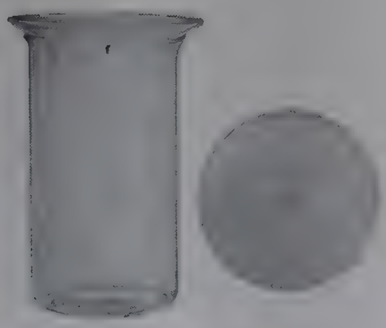
All items on this page normally available from stock.

BJ-835

BJ-840

BJ-860

BJ-910



BJ-950

PLASTICS BEAKERS

Properties of various plastics materials will be found under the heading PLASTICS—and will assist in selection of beakers for particular purposes.

BJ-835

BEAKERS, polypropylene, medium form, with spout.

Capacity	25	50	100	250	400 ml	
Ten	**£0·55**	**0·64**	**0·84**	**1·40**	**1·80**	*c*
Each	**£0·13**	**0·14**	**0·16**	**0·21**	**0·25**	

Capacity	600	1000	2000	5000 ml	
Ten	**£2·10**	**3·40**	**5·00**	**22·00**	*c*
Each	**£0·27**	**0·40**	**0·56**	**2·45**	

BJ-840

BEAKERS, expendable clear polystyrene, squat form, 20 ml. Useful for medical and radioisotope work. In pack of 100. ... 10 packs **£5·90** Pack **£0·66** *c*

***BJ-860**

BEAKERS, PTFE, squat form, inert to all chemicals except molten alkali metals and fluorine, and can thus replace platinum for many purposes. Suitable for use up to 300°C.

Capacity	50	100	150	250	500	1000 ml	
Each	**£3·30**	**3·60**	**3·90**	**4·20**	**7·90**	**13·10**	*m*

METAL BEAKERS

BJ-910

BEAKERS, stainless steel, with spout.

Capacity approx.	200	350	550	700	1250 ml	
Diameter	60	65	75	75	100 mm	
Height	75	115	125	165	165 mm	
Each	**£1·60**	**1·75**	**2·30**	**2·90**	**2·90**	*m*

BJ-915

BEAKERS, stainless steel, as BJ-910 but with full internal and partial external **coating of PTFE** to reduce adherence of residues and facilitate cleaning. Suitable for use up to 220°C.

Capacity approx.	550	700	1250 ml	
Each	**£4·20**	**5·10**	**5·40**	*m*

BEAKER COVERS

BJ-950

BEAKER COVERS, polythene, with radial ribs to raise cover from the beaker and allow evaporation.

Diameter	95	108 mm	
Ten	**£1·90**	**1·90**	*m*
Each	**£0·26**	**0·26**	

EJ-105 Beaker cover, polythene, with slot **WE-025 et. seq. Watch glasses** for use as beaker covers	See entries in List No. sequence

All items on this page normally available from stock.

BELL JARS

***BK-321**

BELL JARS, soda-lime glass, with knob and ground flange.

Height to shoulder	22·5	25	30 cm	
Dia. inside flange	12·5	15	20 cm	
Ten	**£20·00**	**24·00**	**40·00**	c
Each	**£ 2·25**	**2·70**	**4·40**	

***BK-332**

BELL JARS, soda-lime glass, with ground flange and socket. **Without stopper or stopcock.**

Height to shoulder	22·5	25	30 cm	
Dia. inside flange	12·5	15	20 cm	
Socket	29/32	29/32	29/32	
Ten	**£22·00**	**26·00**	**43·00**	c
Each	**£ 2·45**	**2·90**	**4·80**	

ACCESSORIES

BK-343 **Stopcock,** glass, cone 29/32. Ten **£20·50** Each **£2·30** c

SU-710 **Stopper,** polypropylene, cone 29/32. For price see entry in List No. sequence.

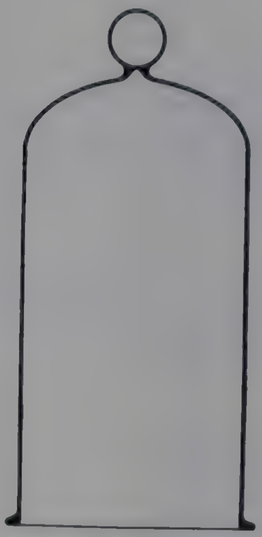
Q-SB29 **Stopper,** glass, cone 29/32. For price see entry in *Quickfit* section.

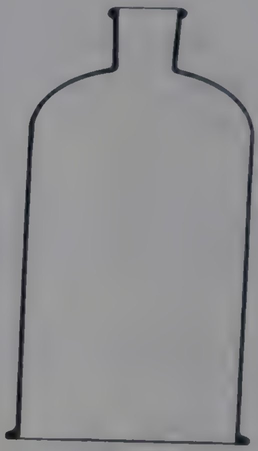
BK-345 **Bases,** plate glass, frosted one side.

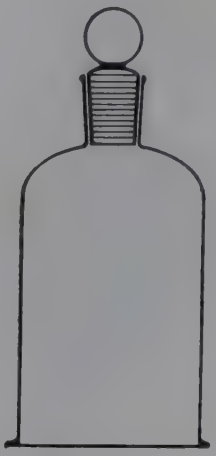
Size	20×20	25×25 cm	
For jar dia.	12·5, 15	20 cm	
Ten	**£3·70**	**4·20**	c
Each	**£0·43**	**0·47**	

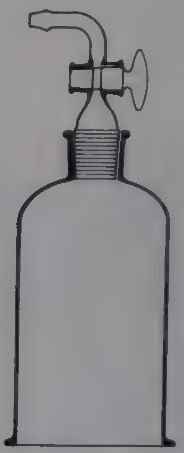
SC-422

BELL JAR, Copenhagen pattern. For details see entry in List No. sequence.


BK-321


BK-332


BK-332 with stopper


BK-332 with stopcock

BELLOWS

BK-620

BELLOWS, foot, designed to give a steady air pressure and thus be suitable for glassblowing purposes. Overall dimensions, including step and air pipe, 38×30×18 cm.

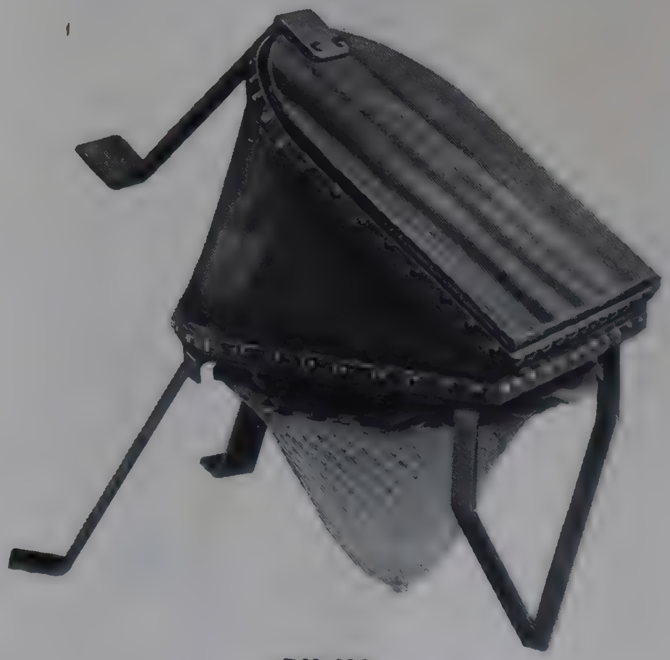
Each **£11·00** c

REPLACEMENT PARTS

BK-622	**Rubber disk,** 30 cm dia....	Each	**£0·45**	c
BK-624	**String net,** to limit expansion of rubber disks	Each	**£0·50**	c

RV-030

BELLOWS, PVC. For details see entry in List No. sequence.


BK-620

All items on this page normally available from stock.

BIOLOGY

This section lists specialised apparatus for biological sciences. As most schools and colleges assemble their own apparatus for plant physiological experiments, we list only the special glass parts for such experiments.

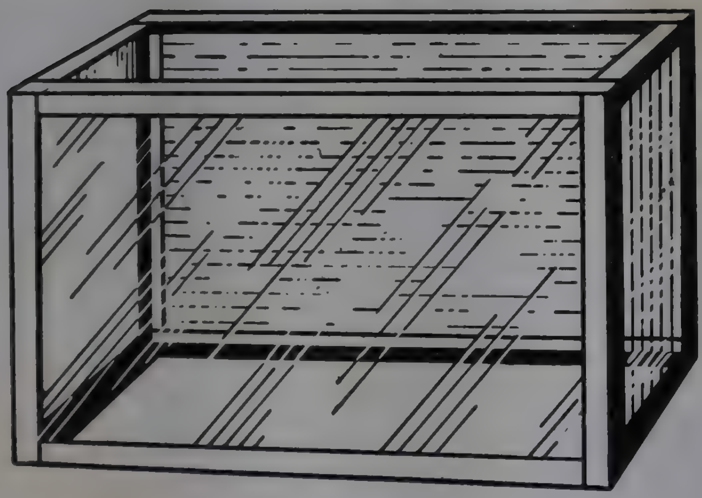
Other more general apparatus used in biology but not listed in this section will be found either in alphabetical sequence or under particular headings as indicated in the following lists.

To be found in alphabetical sequence.

- Bell jars
- Calorimeters
- Chromatography
- Colorimeters
- Culture
- Dissecting
- Freeze drying
- Histology
- Incubators
- Magnifiers
- Microbiology
- Microscopes
- Microtomes
- Refrigerators
- Seed testing
- Sintered glass plates

To be found under headings as indicated.

Anaerobic culture jars	see	Culture
Aerators	see	Air pumps
Cobalt chloride paper	see	Test papers
Colony counter	see	Culture
Copenhagen jar	see	Seed testing
Cork borers for cutting leaf sections	see	Cork accessories
Cork slabs for mounting	see	Corks
Dewar vacuum flasks	see	Vacuum flasks
Dropping bottles	see	Bottles, dropping
Macerators	see	Mixers
Moisture tensiometer	see	Soil testing
Pneumatic troughs for osmosis experiments	see	Gas collecting
Porcelain tiles with cavities	see	Tiles
Slides and cover slips	see	Histology
Slide drying plate	see	Histology
Specimen tubes	see	Tubes, specimen
Thunberg tubes	see	Medical sciences
Whirling hygrometer	see	Hygrometers



BL-101

BL-101

AQUARIA, angle iron frame, nylon coated. This finish, together with a resilient plastics cement securing the glass panels, provides aquaria which are very much less liable to rust and leakage than earlier patterns. Width 30 cm by 30 cm deep.

Length	60	90	120 cm	
Each	**£7·00**	**9·75**	**11·50**	*m*

TB-550 to TB-600

AQUARIA, glass, see entries in List No. sequence.

AF-380 to AF-400

AERATORS, suitable for aquarium use, see entries in List No. sequence.

BL-110

DIFFUSER STONE, square, with long plastics tube stem for connection to aerator ... ... Each **£0·13** *m*

BL-125

AQUARIUM HEATER, mounted in a glass tube, length 13 cm, dia. 2 cm. Heater rating 100W. With connecting cable. For 200/250V supplies ... ... Each **£0·75** *c*

BL-135

AQUARIUM THERMOSTAT, mounted in a glass tube, length 13 cm, dia. 2 cm. Controls to ±2degC. Supplied set at approximately 25°C and adjustable between 18°C and 30°C. Includes integral indicator lamp and supplied with cable and two-pin plug and socket. Each **£1·10** *m*

DK-640

DESICCATOR CABINET, clear plastics. Suitable for plant growth studies. For details and price see entry in List No. sequence.

BL-110

BL-135

All items on this page normally available from stock.

BL-285

MOUNTING BOXES, rectangular, stiff card, white inside, with glazed lid.

Length	6	9	13	18 cm	
Width	4·5	6	9	13 cm	
Height	2·5	2·5	5	5 cm	
Ten	**£1·95**	**2·20**	**2·70**	**3·50**	c
Each	**£0·26**	**0·28**	**0·33**	**0·41**	

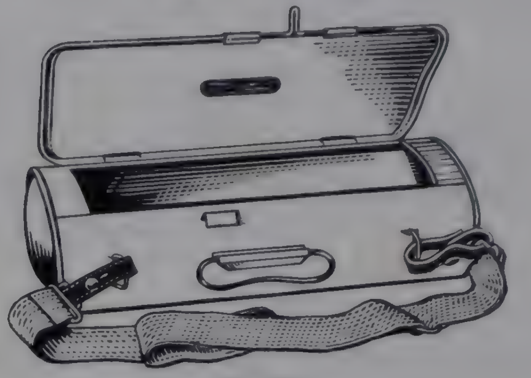
BL-285

BT-820

BOXES, clear polystyrene, circular, suitable for use as entomological mounting boxes. See entry in List No. sequence.

CV-050

CORK SHEET, suitable for cutting insert bases for above boxes, also for general specimen mounting purposes. See entry in List No. sequence.


BL-300

BL-300

VASCULA, enamelled aluminium, complete with webbing straps. Dimensions 32×16×6 cm.
Each **£2·90** *m*

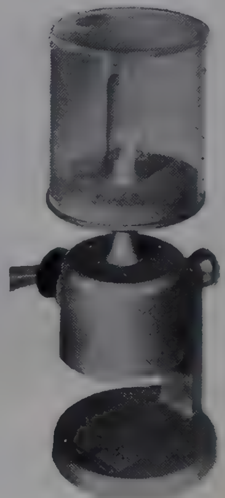
BL-320

PRESS, woven wire, galvanised finish, 45×30 cm fitted with webbing straps allowing for capacity up to approx. 10 cm thickness ... ... Each **£2·20** *m*

BL-320

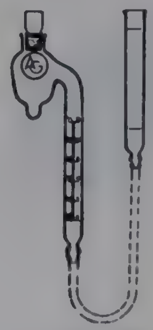
BL-420

CLINOSTAT, electric, giving four revolutions per hour. Can be inclined at any angle from 0° to 90°. Supplied complete with cork disk, plastics cover and bottle holder, and suitable for 200/250V a.c. supplies only ... ... Each **£11·35** *m*


BL-420

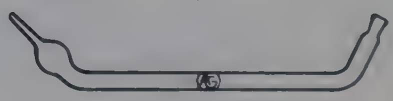
BL-500

RESPIROMETER, Ganong, graduated and levelling tubes only ... ... Each **£3·70** *a*


BL-500

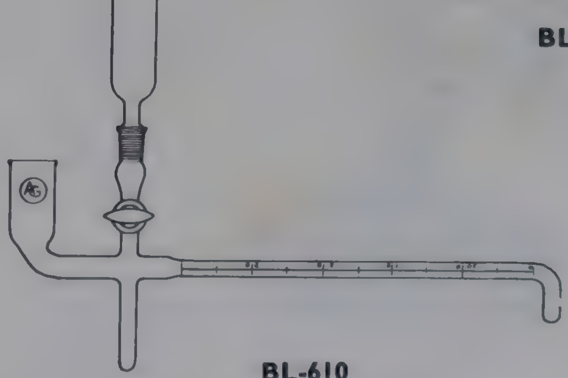
BL-520

ABSORPTION TUBE, Pettenkoffer, for estimation of carbon dioxide produced in respiration.
Each **£0·60** *a*


BL-520

BL-610

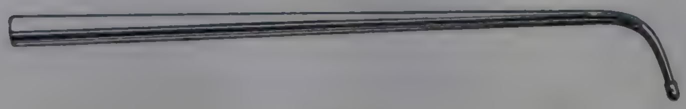
POTOMETER, Ganong, with 10/13 joint, for measuring transpiration rates, including funnel tube.
Each **£4·00** *a*


BL-610

COLONY COUNTER see **CX-300**
MAGNIFIERS see **MA-660** et seq.
COPENHAGEN JAR see **SC-422**
SINTERED GLASS PLATES for seed testing and growing excised embryos see **SF-500** et seq.

All items on this page normally available from stock.

BLACKBOARDS	see FURNITURE
BLOOD TESTING	see MEDICAL SCIENCES
BLOWBALLS	see RUBBER SUNDRIES


BR-036

BR-036

BLOWPIPE, nickel plated brass, curved, length 20 cm.
Ten **£1·50** Each **£0·22** c

BR-050

CHARCOAL BLOCKS, compressed, for blowpipe analysis, 50 × 30 × 30 mm ... Ten **£0·60** Each **£0·13** c

BR-055

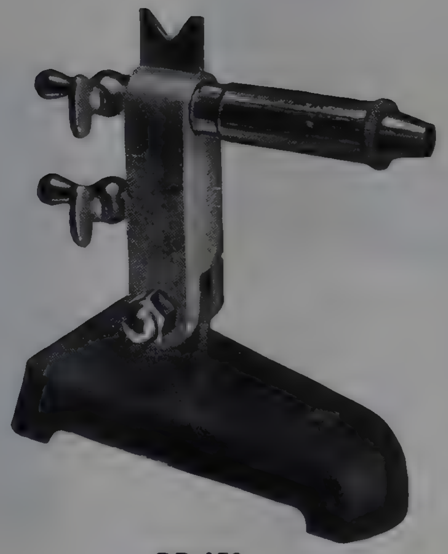
COBALT GLASS PLATES, for blowpipe analysis, 75 × 25 mm ... ... Ten **£0·55** Each **£0·13** c

CX-560

WIRE HOLDER, with collet chuck. For details see entry in List No. sequence.

Platinum wire and foil for blowpipe analysis, see Platinum.

GLASSWORKING BLOWPIPES


BR-150
BR-160

SINGLE JET BLOWPIPES

BR-150

BLOWPIPE, *Gallenkamp*, **laboratory pattern.** A powerful burner with separate gas and air taps, capable of giving a very wide range of flames suitable for all laboratory glass blowing on soda-lime glass. Fitted with a V-notch for glass cutting and shaping. Supplied complete with three interchangeable jets, for use on coal gas.
Ten **£46·00** Each **£5·10** *b*

BR-155

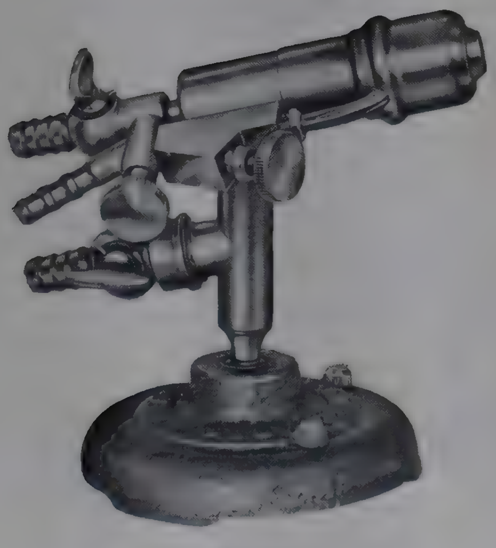
BLOWPIPE, *Gallenkamp*, as BR-150 but with additional oxygen boost tap for working borosilicate glass.
Ten **£57·00** Each **£6·40** *b*

BR-160

BLOWPIPE, *Gallenkamp*, as BR-150 but modified for use with bottled gases. With jet suitable for use with butane at 11 in W.G. pressure and propane at 13 to 14 in W.G. pressure ... ... Ten **£62·00** Each **£6·80** *b*

Gas cylinder fittings, control valves, etc. for oxygen or LPG cylinders for use with any of above blowpipes, see GAS CYLINDERS.

Glassblowing tools see GP-100 et seq. in List No. sequence.


BR-180

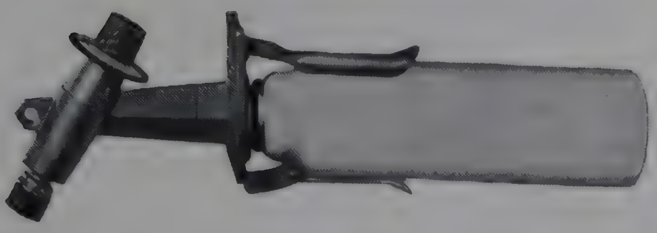
***BR-180**

BLOWPIPE, for natural (methane) gas and compressed air and oxygen supplies. With three interchangeable jets. Suitable for working soda-lime and borosilicate glass. This blowpipe provides a stable flame which can be adjusted easily from a large brush down to a fine needle. The use of air and oxygen together with the gas effectively prevents the flame breaking away from the burner. With a heavy base and ball jointed pillar, the burner can be used safely at any convenient angle on the bench ... ... Each **£33·00** *m*

All items on this page normally available from stock.

BLOWPIPES

(continued)



BR-215

BR-215

BLOWPIPE. A hand held or free standing butane burner capable of giving from a fine needle to a large brush flame by adjustment of the gas control needle valve. Complete with butane canister and instructions for use. Each **£1·97** *m*

REPLACEMENT PART

PF-176 **Butane canisters.** For details and price see entry in List No. sequence.

BR-220

BR-220

BLOWPIPE, Bornkessel, hand type, for burning coal gas with air. With separate regulating taps giving fine flame control ... ... Each **£4·20** *f*

BR-240 with BR-245

BR-240

BLOWPIPE, *Flamemaster*, hand torch, complete with Flexiflame unit and nozzle cap. Suitable for burning coal gas with air (or air/oxygen mixture when using BR-242) and capable of giving a large brush or small needle flame. With economiser trigger which cuts air and gas down to a pilot flame when the operator's grip is relaxed. Rapid action needle valve controls ... ... Each **£9·60** *m*

REPLACEMENTS AND ACCESSORIES

BR-242 **Oxygen air mixer,** for working hard glass. Each **£4·75** *f*

BR-244 **Spare Flexiflame unit,** with stainless steel multi-hole air jet ... ... Each **£1·00** *f*

BR-245 **Maxiflame unit,** to replace Flexiflame unit in BR-240 for burning butane, coal gas or natural gas with compressed air. Comprises jet and nozzle assembly capable of producing a hot fierce flame suitable for brazing. Each **£2·20** *f*

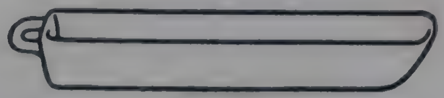
BR-246 **Oxyflame units, set of three,** to replace Flexiflame unit in BR-240, for burning butane, coal gas or hydrogen with oxygen only. Capable of giving three sizes of very hot flame ... ... Set **£2·85** *f*

BR-250 **Soldering bolt attachment,** converts torch into soldering iron with precise temperature control for light soldering ... ... Each **£2·95** *f*

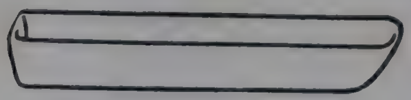
BR-252 **Bench clamp,** converts BR-240 into bench blowpipe. Each **£2·15** *f*

BR-254 **Tubing,** twin bore, with clip, in 3 metre lengths. Each **£1·00** *f*

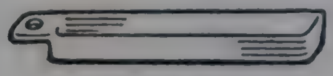
BOATS



BR-620
BR-640



BR-681



BR-730

BR-620

BOATS, combustion, *Royal Worcester* porcelain, glazed, with handle.

No.	2	3	4	7	
Length	60	70	75	100 mm	
Width	10	6	11	18 mm	
Height	6	6	6	12 mm	
Ten	**£1·05**	**1·25**	**1·50**	**2·75**	*d*
Each	**£0·18**	**0·19**	**0·22**	**0·34**	

BR-640

BOATS, combustion, *Vitreosil* translucent silica, glazed, with handle.

No.	1	2	3	4	
Length	50	80	80	100 mm	
Width	15	18	20	20 mm	
Height	10	10	13	12 mm	
Ten	**£5·37**	**6·83**	**7·87**	**9·50**	*m*
Each	**£0·60**	**0·78**	**0·88**	**1·06**	

BR-681

BOATS, combustion, highly refractory material, specially made for analysis of carbon and sulphur in steel. Batch tested for carbon and sulphur blanks. In packs of 100.

Length	73	91	98 mm	
Width	15	18	17 mm	
Height	13	14	12 mm	
Pack	**£2·10**	**2·10**	**2·10**	*c*

BR-730

BOATS, micro combustion, *Royal Worcester* porcelain, glazed, with handle, made to BS 1428, Part I1.

No.	1	2	3	
Length excluding handle	14	26	46 mm	
Length overall	21	34	55 mm	
Depth	3	4	5 mm	
Ten	**£1·05**	**1·15**	**1·40**	*d*
Each	**£0·18**	**0·19**	**0·21**	

CRUCIBLES see CW-210 et seq.
IGNITION DISHES see DM-280 et seq.
For details see entries in List No. sequence.

All items on this page normally available from stock.

BOTTLES

INDEX

to bottles in this section and under other headings in the catalogue.

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Woulff bottles	Gas washing

BOTTLE CAPACITIES

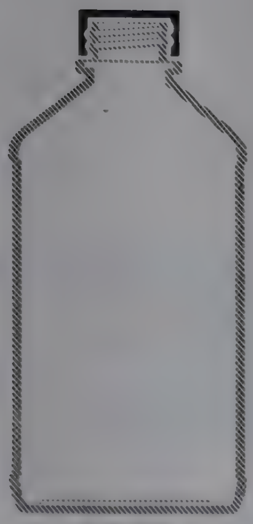
All bottle capacities listed in this catalogue are nominal capacities.

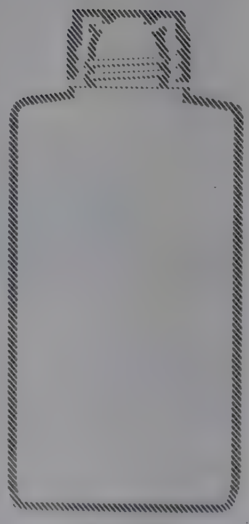
In view of the general use of metric units in laboratories, all capacities are listed in a conventional metric series. Bottles manufactured to nominal capacities in other units have been converted to metric in accordance with the following table.

Manufacturers nominal capacity quoted in			Metric equivalent	
oz	lb	gal	Calculated ml	Listed nominal ml
½			14	15
1			28	30
2			57	60
4			114	125
6			171	175
8			227	250
12			341	350
16	1		454	500
			litres	litres
32	2		0·91	1
64	4		1·82	2
80		½	2·27	2
90			2·56	2·5
160		1	4·55	4·5
		2	9·09	9
		5	22·73	22

GENERAL PURPOSE BOTTLES

NARROW NECK, PLASTICS


BT-100


BT-105

For properties of plastics materials see data under page heading **PLASTICS**.

BT-100

BOTTLES, polythene, narrow neck, fitted with black urea screw cap and vinyl faced liner.

Capacity	60	125	250	500 ml	
Thread R4/	20	20	20	28	
100	£5·40	6·40	8·00	11·40	c
10	£0·60	0·72	0·90	1·30	
Each	£0·13	0·14	0·16	0·20	

Capacity	1000	2000	4500 ml	
Thread	R3/33	R4/31	R4/31	
100	£15·00	22·00	33·00	c
10	£ 1·70	2·45	3·70	
Each	£ 0·23	0·31	0·42	

BT-350 Screw caps, spare for above bottles, see entry in List No. sequence.

BT-105

BOTTLES, polypropylene, narrow neck fitted with polypropylene screw cap. Can be sterilised in an autoclave up to 135°C. In packs of 10.

Capacity	30	60	125	250	500	1000 ml	
10 packs	£5·00	5·85	6·25	9·58	13·75	28·75	m
Pack	£0·63	0·71	0·79	1·13	1·75	3·50	

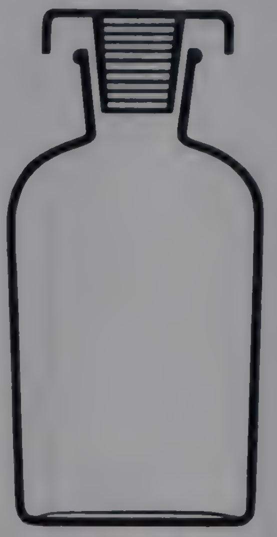
All items on this page normally available from stock.

GENERAL PURPOSE BOTTLES

NARROW NECK, GLASS

BOTTLES, plastics-stoppered reagent, narrow neck ground interchangeably and fitted with hexagonal head dustproof red polypropylene stoppers.

Capacity	30	60	125	250	500	1000 ml
Neck size	16/16	16/16	19/22	24/29	24/29	29/32



BT-140
BT-142

BT-140 in clear white glass

100	**£11·60**	**13·00**	**13·60**	**15·00**	**19·50**	**32·00**	*m*
10	**£ 1·30**	**1·45**	**1·50**	**1·65**	**2·15**	**3·60**	
Each	**£ 0·20**	**0·21**	**0·22**	**0·23**	**0·28**	**0·41**	

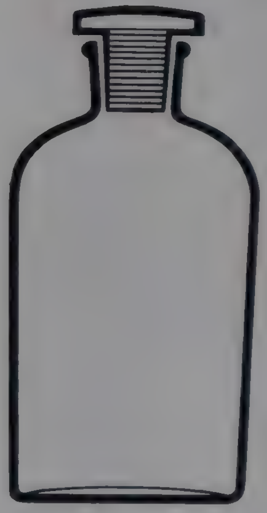
BT-142 in amber glass

100	**£19·00**	**21·00**	**22·00**	**27·00**	**37·00**	**58·00**	*m*
10	**£ 2·10**	**2·35**	**2·45**	**3·00**	**4·10**	**6·60**	
Each	**£ 0·27**	**0·29**	**0·31**	**0·36**	**0·46**	**0·72**	

SU-710
SU-712 } **STOPPERS, polypropylene,** interchangeable, in several colours suitable for colour coding above bottles. For prices see entries in List No. sequence.

BOTTLES, glass-stoppered reagent, narrow neck with interchangeable ground glass stopper.

Capacity	30	60	125	250	500	1000 ml
Neck size	16/16	16/16	19/22	24/29	24/29	29/32



BT-150
BT-152
BT-165

BT-150 in clear white glass

100	**£16·00**	**17·00**	**19·50**	**23·00**	**27·00**	**41·00**	*m*
10	**£ 1·80**	**1·90**	**2·20**	**2·55**	**3·00**	**4·60**	
Each	**£ 0·24**	**0·25**	**0·28**	**0·32**	**0·36**	**0·50**	

BT-152 in amber glass

100	**£22·00**	**24·00**	**26·50**	**32·00**	**40·00**	**60·00**	*m*
10	**£ 2·45**	**2·65**	**2·95**	**3·60**	**4·40**	**6·80**	
Each	**£ 0·31**	**0·33**	**0·35**	**0·41**	**0·49**	**0·74**	

BT-165

BOTTLES, stoppered reagent, *Pyrex brand* glass, narrow neck with interchangeable ground glass stopper.

Capacity	60	100	250	500	1000 ml	
Neck size	19/17	19/17	24/29	24/29	40/38	
Std. pack qty.	24	24	36	24	24	
Std. pack	**£12·40**	**12·75**	**24·60**	**19·00**	**24·20**	*d*
Each	**£ 0·60**	**0·62**	**0·82**	**0·92**	**1·18**	

Capacity	2	5	10	20 litre	
Neck size	40/38	50/42	60/46	60/46	
Std. pack qty.	6	2	1	1	
Std. pack	**£8·00**	**4·45**	**4·20**	**6·25**	*d*
Each	**£1·45**	**2·30**	—	—	

For reservoir bottles with standard joint neck see BW-655 in List No. sequence.

REAGENT BOTTLE SHELVES

For wall benches:
Shelves 4½ in deep; choice of three lengths.

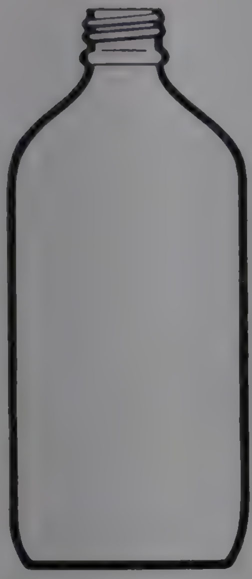
For full details see FU-950/951/952 in List No. sequence.

For island benches:
Shelves 9 in deep; choice of three lengths.

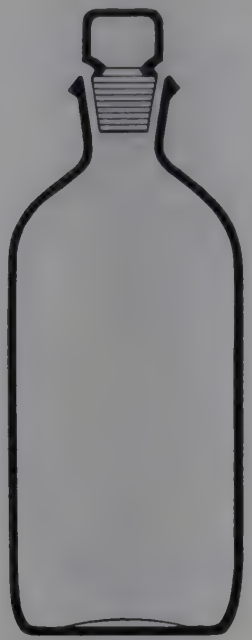
For full details see FU-955/956/957 in List No. sequence.

All items on this page normally available from stock.

GENERAL PURPOSE BOTTLES



BT-172



BT-180
BT-182

RACKS FOR WINCHESTER BOTTLES
See FW-532 and FW-534 in List No. sequence.

NARROW NECK, GLASS

(continued)

BT-172

BOTTLES, screw neck, Winchester shape, clear white glass. The necks have moulded screw threads to BS 1918 and a choice of caps in various materials as listed below. **Supplied without caps.**

Capacity	30	60	125	250 ml	
Screw thread R3/	20	22	24	24	
Pack qty.	144	144	72	48	
Pack	£2·50	2·65	2·00	1·55	c

Capacity	500	1000	2500 ml	
Screw thread	R3/28	R4/31	R4/31	
Pack qty.	24	12	12	
Pack	£1·25	1·10	2·10	c

SCREW CAPS, suitable for above bottles.

For bottles 30 to 500 ml with R3/ threads.

BT-335	**Aluminium**	For prices and details see entries in List No. sequence.
BT-340	**Black bakelite**	
BT-342	**Polypropylene**	
BT-345	**White urea**	

For bottles 1000 and 2500 ml with R4/ threads.

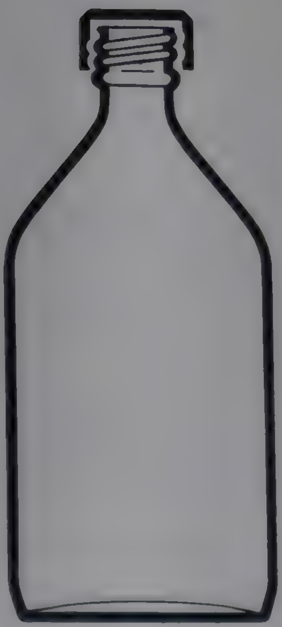
BT-350	**Black urea**	For prices and details see entries in List No. sequence.
BT-355	**Black urea**	

BOTTLES, glass stoppered, Winchester shape, with individually ground and fitted peg stoppers.

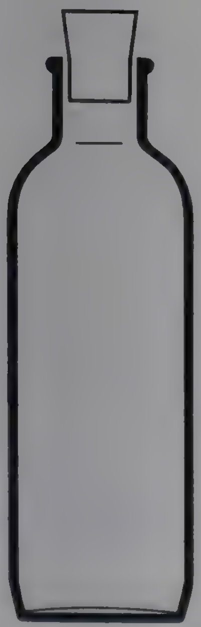
BT-180 in clear white glass.

BT-182 in amber glass.

Capacity	125	250	500	1000	2500 ml	
144	£14·00	16·00	20·00	29·00	45·00	c
12	£ 1·30	1·50	1·85	2·70	4·20	
Each	£ 0·18	0·20	0·23	0·29	0·41	



BT-195



BT-200

BT-195

BOTTLES, screw neck, clear white glass, **medical pattern** to BS 1679 Part 6. The necks have moulded screw threads to BS 1918. Supplied capped with polypropylene sealing cap in sealed pack.

Capacity	50	100	150	200	300	500 ml	
Thread R4/	22	22	22	28	28	28	
Pack qty.	144	144	72	72	36	36	
Pack	£3·80	4·10	2·30	2·75	1·65	2·25	c

BT-200

BOTTLES, oil sample, clear white glass. Supplied corked.

Capacity	225	450 ml	
100	£5·80	8·80	c
10	£0·64	0·98	
Each	£0·14	0·17	

All items on this page normally available from stock.

GENERAL PURPOSE BOTTLES

For properties of plastics material see data under page heading **PLASTICS**.

WIDE NECK, PLASTICS

BT-205

BOTTLES, polythene, semi-wide neck, suitable for storage of oil samples, reagents or standard solutions. These robust bottles are fitted with polythene screw caps with independent deep seating inner stopper.

Capacity	250	500	1000 ml	
Ten	**£1·50**	**1·65**	**2·50**	c
Each	**£0·22**	**0·23**	**0·32**	

BT-210

BOTTLES, polythene, wide neck, fitted with black bakelite screw cap. In packs of 10.

Capacity	60	125	250	500 ml	
Thread R3/	33	38	58	58	
10 packs	**£5·50**	**6·00**	**9·00**	**10·00**	c
Pack	**£0·61**	**0·66**	**1·00**	**1·10**	

BT-340 Screw caps, spare for BT-210, see entry in List No. sequence.

BT-215

BOTTLES, polypropylene, wide neck, fitted with polypropylene screw cap. Can be sterilised in an autoclave up to 135°C.

Capacity	60	125	250	500	1000 ml	
100	**£6·67**	**7·50**	**17·50**	**22·50**	**32·50**	m
10	**£0·79**	**1·00**	**2·13**	**2·75**	**3·87**	
Each	**£0·15**	**0·17**	**0·28**	**0·34**	**0·44**	

BT-220

BOTTLES, polythene, extra wide neck, fitted with black bakelite screw cap with liner.

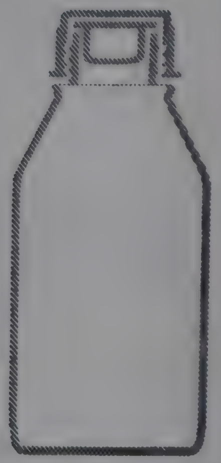
Capacity	125	250	500	1000 ml	
Screw thread R3/	58	70	100	100	
100	**£6·60**	**7·60**	**18·00**	**20·00**	c
10	**£0·74**	**0·84**	**2·00**	**2·25**	
Each	**£0·15**	**0·16**	**0·26**	**0·29**	

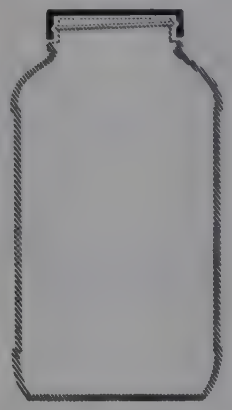
BT-340 Screw caps, spare for BT-220, see entry in List No. sequence.

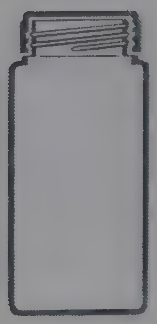
BT-225

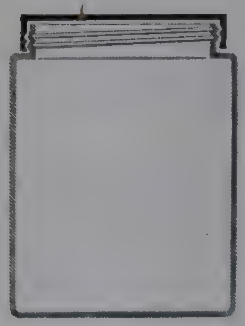
BOTTLES, rigid polythene, extra wide neck, square shape, fitted with rigid polythene screw cap.

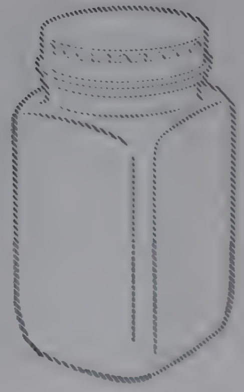
Capacity	500	1000	2000 ml	
Ten	**£2·00**	**2·30**	**3·00**	c
Each	**£0·26**	**0·29**	**0·36**	


BT-205


BT-210

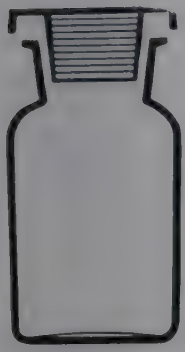

BT-215


BT-220

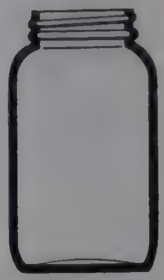

BT-225

All items on this page normally available from stock.

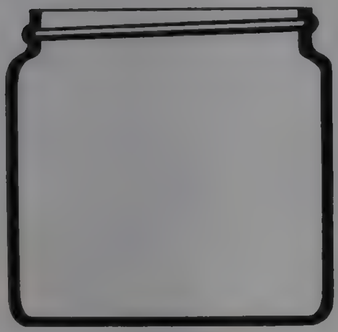
GENERAL PURPOSE BOTTLES



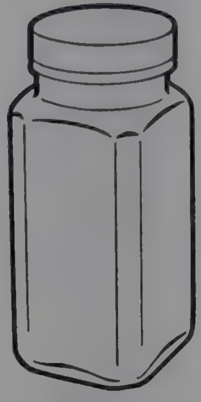
BT-250



BT-260



BT-265



BT-280

WIDE NECK, GLASS

BT-250

BOTTLES, glass-stoppered reagent, clear white glass, wide neck with individually ground and fitted dust proof glass stoppers.

Capacity	60	125	250	500	1000 ml	
36	**£6·80**	**7·40**	**8·00**	**11·00**	**14·20**	c
12	**£2·35**	**2·55**	**2·80**	**3·80**	**5·00**	
Each	**£0·27**	**0·28**	**0·30**	**0·38**	**0·47**	

BT-260

BOTTLES, wide screw neck, clear white glass. The necks of these bottles have moulded screw threads to BS 1918 and a choice of metal or plastics caps is listed below. **Supplied without caps.**

Capacity	15	30	60	125	175 ml	
Screw thread R3/	28	33	38	38	48	
Pack qty.	144	144	144	72	72	
Pack	**£1·95**	**2·35**	**2·45**	**1·80**	**2·00**	c

Capacity	250	350	500	1000 ml	
Screw thread R3/	48	51	51	63	
Pack qty.	72	24	24	24	
Pack	**£2·25**	**1·00**	**1·20**	**2·00**	c

SCREW CAPS, suitable for above bottles.

BT-330 **Enamelled metal**
BT-340 **Black bakelite**
} For prices and details see entries in List No. sequence.

BT-265

BOTTLES, extra-wide screw neck, clear white glass. The necks of these bottles have moulded screw threads to BS 1918 and a choice of metal or plastics caps is listed below. **Supplied without caps.**

Capacity	15	30	60	125	250 ml	
Screw thread R3/	38	38	51	58	89	
Pack qty.	144	144	72	72	48	
Pack	**£1·95**	**2·35**	**1·30**	**1·60**	**1·80**	c

SCREW CAPS, suitable for above bottles.

BT-330 **Enamelled metal**
BT-340 **Black bakelite**
} For prices and details see entries in List No. sequence.

BT-280

BOTTLES, extra-wide screw neck, square shape, clear white glass, with plastics screw caps.

Capacity	500	1000	2000 ml	
12	**£1·45**	**2·00**	**2·90**	c
Each	**£0·19**	**0·23**	**0·31**	

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

GENERAL PURPOSE BOTTLES

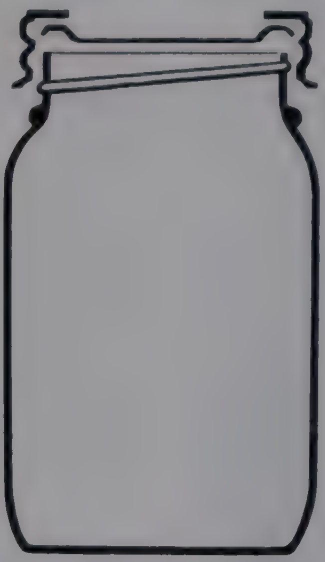
BT-290

BOTTLES, Kilner, wide neck with screw sealing ring and expendable coated cap.

Capacity Pack qty.	500 12	1000 12	2000 ml 6	
10 packs	**£13·00**	**15·50**	**11·40**	c
Pack	**£ 1·45**	**1·75**	**1·30**	

BT-292 **Caps,** coated metal, spare for above. In pack of 25.
10 packs **£6·60** Pack **£0·74** c

Bottle brushes see BU-440/442
Bottle washing equipment see WD-020
Full details in List No. sequence.



BT-290

BOTTLE CAPS

R3 Threads to BS 1918

BT-330

BOTTLE CAPS, plated and enamelled metal with pulpboard liner. In packs of 25.

Thread R3	38	48	51	58	89 mm	
10 packs	**£1·20**	**1·45**	**1·60**	**1·90**	**4·50**	c
Pack	**£0·19**	**0·21**	**0·23**	**0·25**	**0·50**	

BT-335

BOTTLE CAPS, aluminium, with black rubber liner, sterilisable. In packs of 25.

Thread R3	20	22	24	28 mm	
10 packs	**£3·70**	**4·00**	**4·30**	**5·40**	c
Pack	**0·43**	**0·45**	**0·48**	**0·60**	

BT-340

BOTTLE CAPS, black bakelite, with liner. In packs of 25.

Thread R3	20	22	24	28	33 mm	
10 packs	**£0·80**	**0·90**	**1·00**	**1·25**	**1·70**	c
Pack	**£0·15**	**0·16**	**0·17**	**0·19**	**0·24**	

Thread R3	38	48	51	58 mm	
10 packs	**£1·90**	**2·60**	**2·80**	**3·80**	c
Pack	**£0·26**	**0·32**	**0·34**	**0·44**	

Thread R3	63	70	89	100 mm	
10 packs	**£4·30**	**5·80**	**9·80**	**13·80**	c
Pack	**£0·48**	**0·64**	**1·10**	**1·55**	

BT-342

BOTTLE CAPS, polypropylene. With moulded internal lip which seals without the need for a separate insert. Can be autoclaved. In packs of 25.

Thread R3	20	22	24	28 mm	
10 packs	**£0·96**	**1·00**	**1·10**	**1·20**	c
Pack	**£0·17**	**0·17**	**0·18**	**0·19**	

BT-345

BOTTLE CAPS, white urea, with conical polythene sealing insert. In packs of 25.

Thread R3	20	22	24	28 mm	
10 packs	**£1·35**	**1·45**	**1·55**	**1·80**	c
Pack	**£0·20**	**0·21**	**0·22**	**0·25**	

BT-574

BOTTLE CAP, spraying, with R3/24 neck thread.

BT-576

BOTTLE CAP, dispensing, with R3/24 neck thread. For full details and prices of above see entries in List No. sequence.

R4 Threads to BS 1918

BT-350

BOTTLE CAPS, black urea, with vinyl faced liner. In packs of 25.

Thread R4	20	28	31 mm	
10 packs	**£1·50**	**1·60**	**2·50**	c
Pack	**£0·22**	**0·23**	**0·32**	

BT-355

BOTTLE CAPS, black urea, with conical polythene sealing insert. Thread R4/31. In pack of 25.
10 packs **£2·50** Pack **£0·32** c

PLASTICS STOPPERS
Use with bottles BT-140, BT-142, BT-400, BT-402, etc.
See SU-710/712 in List No. sequence.

All items on this page normally available from stock.

Gallenkamp LABELLED REAGENT BOTTLES

LABELS

All reagent bottles listed in this section are processed in our own factory. Two types of label are available:—

Enamel Labels are silk screen printed using vitreous enamels of the highest available chemical resistance. The legend and border are well defined in black enamel on a dense white tablet. Firing at a high temperature fuses the enamel to the surface of the glass.

Sandblast Labels. Clear glass letters and border stand out from the deeply sandblast background and remain fully legible even when wet.

STOPPERS

Most narrow neck reagent bottles are supplied fitted with interchangeable, dustproof, hexagonal grip polypropylene stoppers (joint sizes as shown for bottles BT-140). The remaining narrow neck bottles with titles of reagents for which polypropylene is unsuitable, also all wide neck bottles are supplied with individually ground dustproof glass stoppers. The stoppers of indicator bottles are of polythene and have integral teat droppers.

AVAILABLE TITLES

Any title can be inscribed on any suitable size of bottle but it is not practicable to stock all the possible combinations.

Labelled bottles are listed in three ranges.

I STOCK TITLES

Bottle size and title combinations which are in heavy demand and are normally available from stock.

2 OTHER LISTED TITLES

Bottle size and title combinations in smaller but regular demand, which are made to order.

3 SPECIAL TITLES

Bottles with titles to customers' special order.

BLANK LABEL BOTTLES

A range of bottles in several sizes having white vitreous enamel writing tablets with black borders is included. These are intended for user inscription by means of wax pencil, paint, felt tip marker, etc.

STOCK TITLES

CODES A = Amber glass bottle G = Glass stoppered bottle.

250 ml REAGENT, narrow neck, enamel or sandblast label		
No.	Code	Title
200		Acetic acid, dil.
202		,, ,, , glacial
204		Acetone
206		Ammonium acetate
208		,, carbonate
210		,, chloride
212		,, hydroxide, conc.
214		,, ,, , dil.
216		,, molybdate
218		,, oxalate
220	A	,, sulphide
222		Barium chloride
224	G	Benzene
226	G	Bromine water
228		Calcium chloride
230	GA	Carbon tetrachloride
232	GA	Chloroform
234	GA	Ether
236		Ethyl alcohol
238		Fehling's solution No. 1
240		,, ,, No. 2
242		Ferric chloride
244	G	Hydrochloric acid, conc.
246		Hydrochloric acid, dil.
248		Lead acetate
250		Lime water
252		Mercuric chloride
254		Methyl alcohol
256	GA	Nitric acid, conc.
258		,, ,, , dil.
260		Potassium chromate
262		,, dichromate
264		,, ferricyanide
266		,, ferrocyanide
268		,, hydroxide
270		,, iodide
272		,, permanganate
274		,, thiocyanate
276	A	Silver nitrate
278		Sodium carbonate
280		,, hydroxide
282		,, phosphate
284		Stannous chloride
286	G	Sulphuric acid, conc.
288		,, ,, , dil.

500 ml REAGENT, narrow neck, enamel or sandblast label		
No.	Code	Title
340		Acetic acid, dil.
342		,, ,, , glacial
344		Ammonium hydroxide, conc.
346		,, ,, , dil.
348		Barium chloride
350	G	Hydrochloric acid, conc.
352		,, ,, , dil.
354	GA	Nitric acid, conc.
356		,, ,, , dil.
358	A	Silver nitrate
360		Sodium hydroxide
362	G	Sulphuric acid, conc.
364		,, ,, , dil.

60 ml DROPPER, enamel label only	
No.	Title
400	Litmus (pH 5·0—8·0)
402	Methyl orange (pH 2·9—4·6)
404	Methyl orange, screened (pH 2·9—4·6)
406	Phenolphthalein (pH 8·3—10·0)
408	Starch indicator
410	Universal indicator (pH 3·0—11·0)

Gallenkamp LABELLED REAGENT BOTTLES

STOCK TITLES

BT-400

BOTTLES, enamel label, glass, narrow neck, **stock range** with titles from appropriate sections of list on opposite page. With stopper.

Capacity	60	250	500 ml	
Bottle type	dropper	reagent	reagent	
Title Nos.	400/410	200/288	340/364	
Ten	**£4·10**	**3·30**	**3·90**	*a*
Each	**£0·46**	**0·39**	**0·45**	

125 ml capacity with titles from stock list see BT-420.

SU-710
SU-712 **STOPPERS,** polypropylene, interchangeable, in several colours suitable for colour coding above bottles. For prices see entries in List No. sequence.

BT-402

BOTTLES, enamel label, narrow neck with **blank label** and border, for user inscription. Clear glass with polypropylene stoppers.

Capacity	60	125	250	500 ml	
Bottle type	dropper	reagent	reagent	reagent	
Ten	**£4·10**	**3·00**	**3·30**	**3·90**	*a*
Each	**£0·46**	**0·36**	**0·39**	**0·45**	

BT-404

BOTTLES, enamel label, wide neck with **blank label** and border, for user inscription. Clear glass with ground glass stoppers.

Capacity	125	250	500 ml	
Ten	**£3·20**	**3·60**	**4·30**	*a*
Each	**£0·38**	**0·42**	**0·48**	

BT-406

BOTTLES, sandblast label, narrow neck, glass, **stock range** with titles from appropriate sections of list on opposite page. With stopper.

Capacity	250	500 ml	
Title Nos.	200/288	340/364	
Ten	**£3·60**	**4·30**	*a*
Each	**£0·42**	**0·48**	

125 ml capacity with titles from stock list see BT-420.

NOTE: QUANTITY RATES for bottles BT-400 and BT-406 apply to orders for mixed titles as well as to single titles.

UNIVERSAL
INDICATOR
PH.3·0-11·0

BT-400
dropper

HYDROCHLORIC
ACID DIL.

BT-400
reagent

BT-404

NITRIC
ACID CONC.

BT-406

All items on this page normally available from stock.

Gallenkamp LABELLED REAGENT BOTTLES

OTHER LISTED TITLES

CODES A = Amber glass bottle. G = Glass stoppered bottle. D = Dropper bottle (enamel label only). W = Wide neck bottle.

No.	Code	Title
450		Acetic acid
452		,, ,, , conc.
454	G	,, anhydride
456	G	Acetyl chloride
458		Alcohol
460		,, absolute
462		,, rectified spirit
464		Alizarin
466	GW	Aluminium, metal
468		Aluminon
470		Ammonia
472	GW	Ammonium acetate, cryst.
474	GW	,, chloride, cryst.
476		,, hydroxide
478		,, ,, 0·880
480	GW	,, iodide, cryst.
482		,, nitrate
484		,, persulphate
486		,, phosphate
488		,, sulphate
490		,, thiocyanate
492	G	Amyl acetate
494		,, alcohol
496	GW	Asbestos
506		Barfoed's reagent
508		Barium carbonate
510	D	,, diphenylamine p-sulphonate
512		Barium hydroxide
514		,, nitrate
516		Benedict's reagent
518		1—Benzoin oxime
520		Boric acid
522	GW	Borax
524	G	Bromine
526	D	Bromocresol green (pH 3·6—5·2)
528	D	Bromocresol purple (pH 5·2—6·8)
530	D	Bromophenol blue (pH 2·8—4·6)
532	D	Bromothymol blue (pH 6·0—7·6)
534	G	Butyl acetate
536		,, alcohol
546		Cacotheline
548	GW	Calcium carbonate
550	GW	,, fluoride
552		,, hydroxide
554		,, sulphate, satd.
556	GA	Carbon disulphide
558	GW	Charcoal
560	GA	Chlorine water
562	G	Chromic acid/sulphuric acid
564	GW	Citric acid, cryst.
566		Cobalt nitrate
568		Copper acetate
570	GW	,, oxide
572		,, sulphate
574	GW	Copper, turnings
584	GW	Devarda's alloy
586		Dimethyl glyoxime
588	D	,, yellow (pH 2·8—4·6)
590		2 : 4 Dinitrophenylhydrazine
592		Diphenylamine
594		Distilled water
604	G	Ethyl acetate
606	D	Eriochrome
616		Ferrous ammonium sulphate
618	GW	Ferrous sulphate
620	GW	Filter paper pulp
622		Formaldehyde
624		Fuchsin
626	GW	Fusion mixture
636	GW	Glass wool
638	GW	Glucose
640		Glycerol
650		Hydrochloric acid
652	A	Hydrogen peroxide
654		Hydroxylamine
656		8-Hydroxyquinoline
666		Iodine
668		Iodine in potassium iodide
670	GW	Iron wire
672	GW	Iron filings
674		Isopropyl alcohol
684	GW	Lead dioxide
686		,, nitrate
688	GW	Litmus papers
698	GW	Magnesia mixture
700		Magnesium nitrate
702		,, sulphate
704		Magneson
706	GW	Manganese dioxide
708		Manganous chloride
710	D	Methyl red (pH 4·2—6·3)
712		Methylated spirit
714	D	Methylene blue
716		Millon's reagent
718	D	Murexide
728		2–Naphthol
730	A	Nessler's reagent
732	A	Nitric acid
734	GA	,, ,, , fuming
736		1–Nitroso 2–Naphthol
746		Oxalic acid
748	GW	,, ,, , cryst.
758	GA	Perchloric acid
760	G	Petroleum ether
762	G	Petroleum ether 40/60°
764	G	,, ,, 60/80°
766	G	,, ,, 80/100°
768	G	,, ,, 100/120°
770	D	Phenol red (pH 6·8—8·4)
772	G	Phosphoric acid
774		Picric acid
776		Potassium aluminium sulphate
778		,, bromide
780		,, chloride
782		,, cyanide
784		Pyridine
786	A	Pyrogallol
796		Schiff's reagent
798	GW	Silica
800	GW	,, gel
802	GW	Soda lime
804	GW	Sodium, metal
806		,, acetate
808	GW	,, ,, , cryst.
810		,, bicarbonate
812		,, bismuthate
814	GW	,, carbonate, anhydrous
816		Sodium chloride
818		,, cobaltinitrite
820		,, diaminoethane tetracetate
822		Sodium fluoride
824		,, hydrogen phosphate
826		,, ,, tartrate
828		,, hydroxide, dil.
830	A	,, hypochlorite
832		,, nitrate
834	GW	,, nitrite, cryst.
836	GW	,, nitroprusside
838	GW	,, peroxide
840		,, sulphate
842	GW	,, ,, anhydrous
844		,, sulphide
846		,, thiosulphate
848	GW	Starch iodide papers
850	GW	Sucrose
852	GW	Sulphur
854		Sulphuric acid
856		Sulphurous acid
866	GW	Tartaric acid, cryst.
868	GW	Test papers
870	D	Thymolphthalein (pH 9·3—10·5)
872	GW	Tin, metal
874	G	Toluene
876	GA	Trichlorethylene
878		Triethanolamine
888	G	Xylene
898	GW	Zinc, dust
900	GW	,, , granulated
902	GW	,, ,, arsenic free
904		,, uranyl acetate
906		Zirconium nitrate

Gallenkamp LABELLED REAGENT BOTTLES

OTHER LISTED SIZES

Silk screen stencils for enamel labels and (except for indicators) sandblast stencils, are maintained at our factory for printing to customer's order. The list of titles available is coded to indicate the type of bottle supplied as appropriate to the reagent to be stored in it.

BT-420

BOTTLES, enamel label, narrow neck, with titles from list on opposite page. 125 ml capacities also available with titles from stock list on page 76.

Capacity Bottle type	60 dropper	120 dropper	125 reagent	250 reagent	500 ml reagent	
Ten	**£5·40**	**5·60**	**4·30**	**4·60**	**5·20**	*a*
Each	**£0·60**	**0·62**	**0·48**	**0·51**	**0·57**	

Note: The 60 ml dropper bottle is available only with titles on opposite page coded D.

BT-425

BOTTLES, enamel label, wide neck, with titles from list on opposite page.

Capacity	125	250	500 ml	
Ten	**£4·50**	**4·90**	**5·60**	*a*
Each	**£0·50**	**0·54**	**0·62**	

It should be noted that several titles in this list are synonyms or minor variants of titles listed in the stock range on page 76. In such cases the more systematic or logical variant in greatest general demand is listed in the stock range and, due to quantity production, is priced more economically.

BT-430

BOTTLES, sandblast label, narrow neck, with titles from list on opposite page. 125 ml capacity also available with titles from stock list on page 76.

Capacity	125	250	500 ml	
Ten	**£4·10**	**4·40**	**5·00**	*a*
Each	**£0·46**	**0·49**	**0·56**	

BT-435

BOTTLES, sandblast label, wide neck, with titles from list on opposite page.

Capacity	125	250	500 ml	
Ten	**£4·30**	**4·70**	**5·40**	*a*
Each	**£0·48**	**0·52**	**0·60**	

NOTE: QUANTITY RATES for bottles BT-420 to BT-435 apply only to quantities of one title.

SPECIAL TITLES MADE TO INDIVIDUAL REQUIREMENTS

We list enamel label bottles BT-402 and BT-404 which have blank labels for the user to add a temporary inscription by means of paint, wax pencil, etc. However in cases where a permanent inscription is necessary then a factory printed label to match other bottles may be required. To meet this requirement we are able to make stencils to order and to supply bottles labelled from them. The quantity price differentials are subject to similar considerations to those described in the preceding section—and it is naturally a relatively expensive process for small quantities.

BT-450

BOTTLES, enamel label, narrow neck, with special titles not included in our lists.

Capacity Bottle type	60 dropper	125 reagent	250 reagent	500 ml reagent	
30	**£19·60**	**15·80**	**16·70**	**18·50**	*a*
10	**£ 7·90**	**6·80**	**7·10**	**7·70**	
3	**£ 3·65**	**3·30**	**3·40**	**3·60**	
Each	**£ 1·95**	**1·85**	**1·90**	**1·95**	

Reagent bottles will be supplied in clear glass with polypropylene stoppers unless otherwise specified on order.

BT-455

BOTTLES, as BT-450 but **wide neck,** with ground glass stoppers.

Capacity	125	250	500 ml	
30	**£16·40**	**17·60**	**19·70**	*a*
10	**£ 7·00**	**7·40**	**8·10**	
3	**£ 3·40**	**3·55**	**3·80**	
Each	**£ 1·90**	**2·00**	**2·10**	

Bottles will be supplied in clear glass unless amber is specified on the order.

When a special title stencil is made to order, it will be kept in store at our factory for two years. The customer requiring a repeat order within this period may obtain the benefit of lower prices **provided that the order is clearly identified** by marking 'special stencil previously made on (date)' and preferably identified with the appropriate List No. in the BT-420 to BT-435 series, at which prices the order will then be invoiced.

BT-460

BOTTLES, sandblast label, narrow neck, with special titles not included in our lists.

Capacity	125	250	500 ml	
30	**£13·70**	**14·60**	**16·40**	*a*
10	**£ 5·60**	**5·90**	**6·50**	
3	**£ 2·80**	**2·90**	**3·10**	
Each	**£ 1·25**	**1·30**	**1·35**	

Bottles will be supplied in clear glass with polypropylene stoppers unless otherwise specified on order.

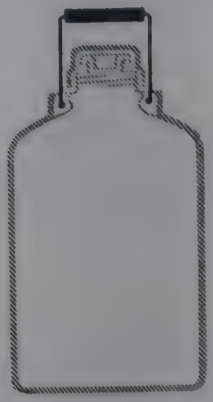
BT-465

BOTTLES, as BT-460 but **wide neck,** with ground glass stoppers.

Capacity	125	250	500 ml	
30	**£14·30**	**15·50**	**17·60**	*a*
10	**£ 5·80**	**6·20**	**6·90**	
3	**£ 2·90**	**3·10**	**3·30**	
Each	**£1·30**	**1·40**	**1·50**	

Bottles will be supplied in clear glass unless amber is specified on the order.

NOTE: QUANTITY RATES for bottles BT-450 to BT-465 apply only to quantities of one title.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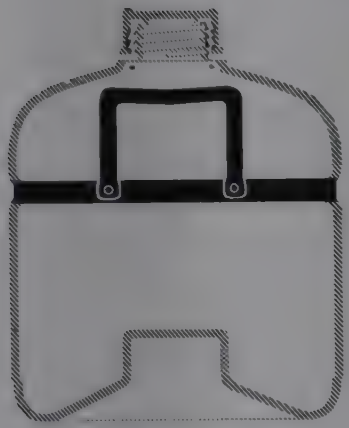
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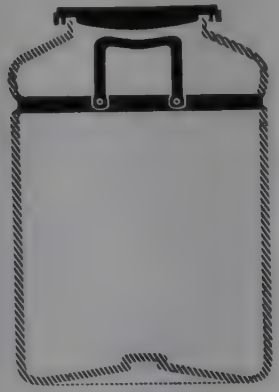
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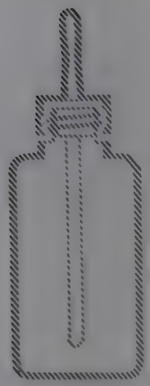
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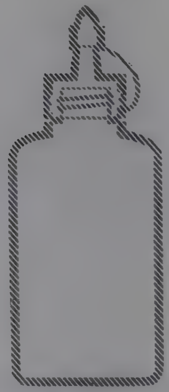
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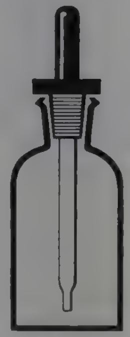
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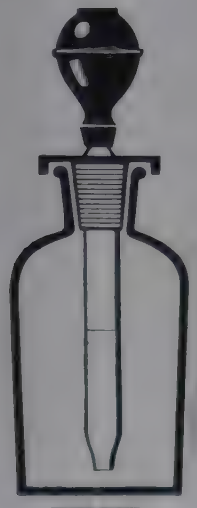
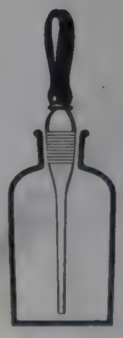

BT-552


BT-555

LARGE CAPACITY PLASTICS BOTTLES

BT-500
BOTTLES, rigid polythene, with internal leak proof closure protected by screw cap. Neck dia. 63 mm.

Capacity	4·5	9	22 litres	
Each	£0·70	0·95	2·40	c

BT-510
BOTTLES, thick polythene, with screw cap and lifting handles.

Capacity	15	25	50 litres	
Diameter	32	32	38 cm	
Each	£3·80	4·50	6·75	m

BT-515
BOTTLES, rigid polythene, with 18 cm dia. wide mouth for easy filling, closed by a tight push-on cap. With lifting handles.

Capacity	15	25	50 litres	
Diameter	32	32	38 cm	
Each	£3·80	4·50	6·75	m

CC-980
CARBOY/BOTTLE TROLLEY suitable for larger sizes of BT-510 and BT-515. For details see entry in List No. sequence.

BOTTLES, DROPPING & DISPENSING

BT-540
BOTTLES, dropping, polythene with screw cap, vinyl teat and polythene pipette.

Capacity	60	125 ml	
Ten	£2·13	2·37	m
Each	£0·28	0·30	

BT-545
BOTTLES, dispensing, polythene with screw cap fitted with elongated spout and closure.

Capacity	60	125	250	500 ml	
Ten	£0·67	0·75	1·50	2·00	m
Each	£0·14	0·15	0·22	0·27	

BT-550
BOTTLES, dropping, glass, with 16/16 interchangeable plastics stopper, vinyl teat and glass pipette.

Capacity	30	60	125 ml	
Ten	£2·20	2·30	2·80	m
Each	£0·28	0·29	0·34	

BT-552
BOTTLES, dispensing, glass with 24/20 interchangeable plastics stopper, vinyl bulb and graduated glass pipette.

Capacity	250	500 ml	
Pipette graduated at	5	5 & 10 ml	
Six	£2·90	3·20	m
Each	£0·52	0·58	

BT-555
BOTTLES, dropping, glass, with ground-in pipette stopper and rubber teat.

Capacity	15	30	60	125 ml	
Ten	£2·45	2·65	2·70	3·10	a
Each	£0·31	0·33	0·33	0·37	

All items on this page normally available from stock.

BOTTLES, DROPPING AND DISPENSING

(continued)

BT-560

BOTTLE, dropping, glass, with ground-in peg stopper having rod fixed to the inside. Capacity 30 ml.
Ten **£2·70** Each **£0·33** c

***BT-565**

BOTTLES, dropping, TK pattern, glass, with ground-in slotted stopper.

Capacity	30	60	100 ml	
36	**£5·50**	**5·90**	**6·60**	c
12	**£1·95**	**2·10**	**2·30**	
Each	**£0·23**	**0·24**	**0·26**	

BT-574

BOTTLE CAP, spraying, press button pattern which delivers liquid as a finely atomised spray. The liquid contacts only polythene and stainless steel. With 11 cm polythene dip-tube and R3/24 neck thread which fits bottle BT-172 ... Ten **£1·40** Each **£0·21** c

BT-576

BOTTLE CAP, dispensing, press button pattern, construction as BT-574, but dispenses approx. 0·75 ml of liquid per stroke. With 11 cm polythene dip-tube and R3/24 neck thread which fits bottles as BT-574.
Ten **£1·40** Each **£0·21** c

BT-580

BOTTLE CAP, dispensing, polythene bellows pattern, delivers approx. 30 ml of liquid per stroke. The tapered stopper fits bottles with neck internal diameters from 14 to 20 mm. With 25 cm polythene dip tube.
Each **£0·40** *m*

BOTTLE CARRIERS AND DRIP TRAYS

BT-600

BOTTLE CARRIER, polythene covered strong steel rod. Suitable for 2 Winchester bottles but will accept most types of bottle up to 13·7 cm dia. Overall height 47 cm ... ... Ten **£16·00** Each **£1·80** c

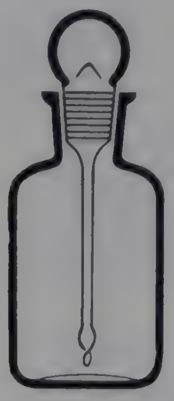
BT-610

BOTTLE CARRIER, polythene, to take Winchester series bottles 2·5 litre size, liquid tight, with carrying handle, pivoted for easy pouring. This carrier forms a very convenient means of carrying and handling Winchester bottles in safety ... ... Each **£3·63** *m*

***BT-640**

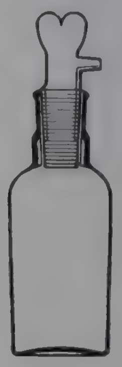
BOTTLE TRAYS, polypropylene, to take single bottles. The bottle stands on raised ribs inside the tray which prevents drips damaging the bench.

Diameter	7	9·5	11·5	13	15 cm	
Ten	**£0·63**	**1·00**	**1·25**	**1·63**	**2·37**	*m*
Each	**£0·14**	**0·17**	**0·19**	**0·23**	**0·30**	

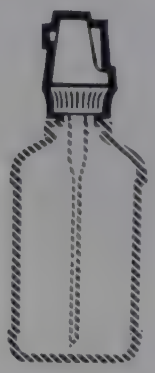


BT-560

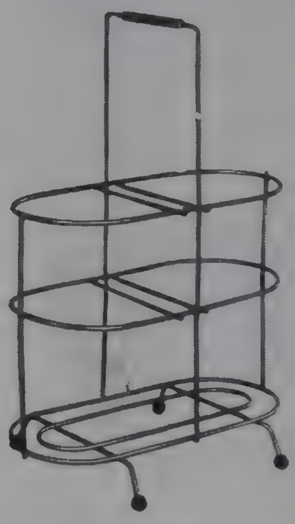
BT-580 with bottle



BT-565



BT-574 with bottle



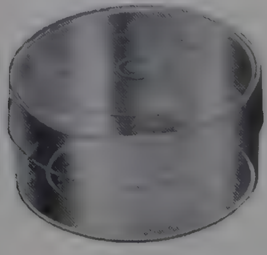
BT-600

BT-610

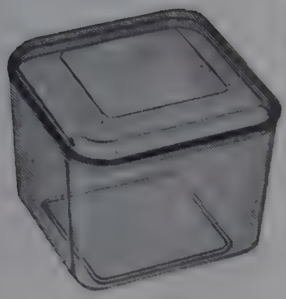
BT-640

All items on this page normally available from stock.

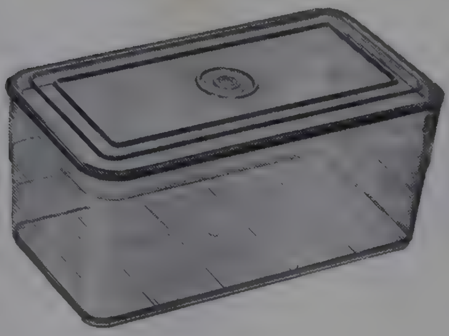
BOXES



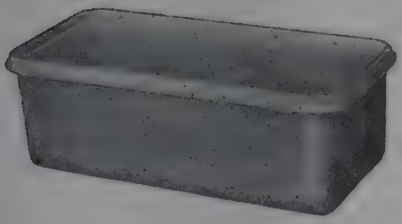
BT-820



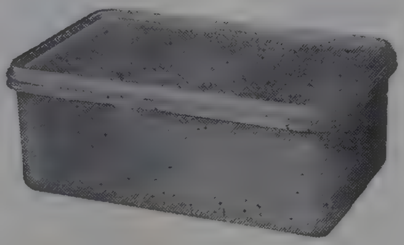
BT-840



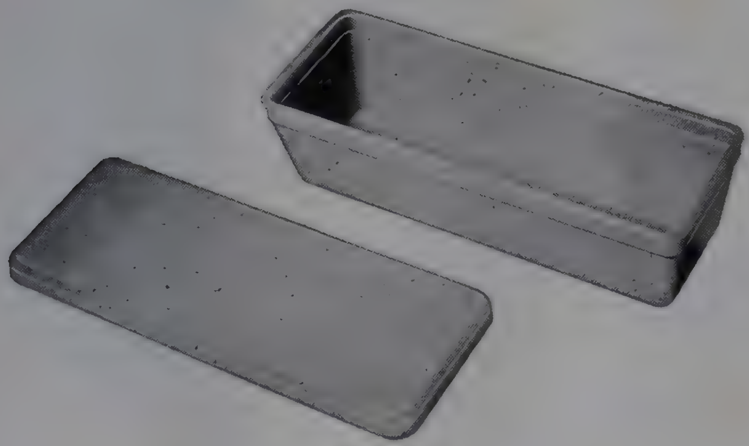
BT-842



BT-850



BT-852



BT-860

BT-862

For properties of plastics material see data under page heading **PLASTICS.**

BT-820

MOUNTING BOXES, clear polystyrene, circular with close fitting lid. For mounting entomological specimens if a cork bottom is used. In packs of 10.

Diameter	50	60 mm	
Depth	25	22 mm	
10 packs	**£3·00**	**3·80**	c
Pack	**£0·36**	**0·43**	

BT-840

BOX, clear polystyrene, squat square shape, with internal fitting lid. Height 87×100 mm square.
Six **£0·96** Each **£0·22** c

BT-842

BOX, clear polystyrene, as BT-840, but rectangular shape. Nominal dimensions 20×10×8·5 cm deep.
Six **£1·50** Each **£0·31** c

BT-850

BOX, polythene, rectangular with press-on sealing lid. Nominal dimensions 21 × 11 × 6·5 cm deep.
Six **£2·50** Each **£0·46** c

BT-852

BOX, polythene, rectangular, as BT-850 but nominal dimensions 21 × 14 × 7 cm deep.
Six **£3·00** Each **£0·54** c

BT-860

BOX, polypropylene, rectangular shape with tapered sides and loose fitting lid. Suitable for use as an instrument tray. Nominal internal dimensions 20×7×5 cm deep.
Six **£2·00** Each **£0·38** c

BT-862

BOX, polypropylene, as BT-860 but with nominal internal dimensions 20 × 15 × 5 cm deep.
Six **£3·50** Each **£0·64** c

DISH, polypropylene, matching above boxes see DM-270 in List No. sequence.

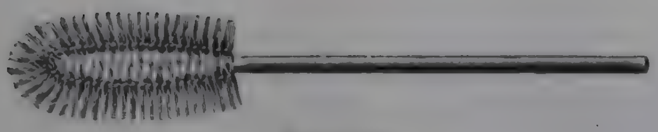
BOXES, glass top, specimen
see BIOLOGICAL SCIENCES

BOXES, postal, for specimen tubes
see TUBES, specimen

BOXES, sterilising see STERILISING EQUIPMENT

All items on this page normally available from stock.

BRUSHES

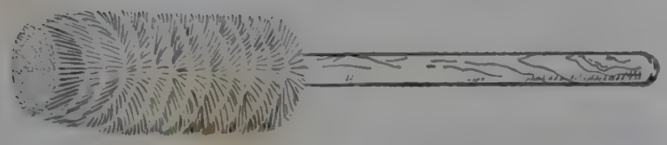


BU-430

BU-430

BRUSH, beaker, with bristles 15 mm long forming a head 15 cm long × 7 cm diameter at widest part, on hardwood handle. Overall length 40 cm.

Ten **£1·00** Each **£0·17** c

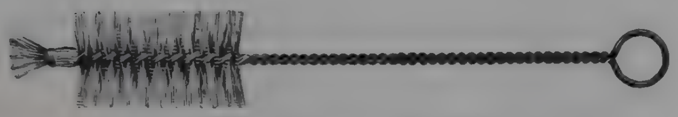


BU-434

BU-434

BRUSH, beaker, black hair with fan end, 15 × 7 cm on hardwood handle. Overall length 40 cm.

Ten **£8·60** Each **£0·96** c



BU-440 BU-442

BU-440

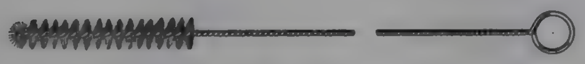
BRUSHES, bottle, white fibre on galvanised wire. In packs of 10.

Size No.	1	2	3	4	5	
Length of head	5	6	7·5	10	15 cm	
Dia. of head	4	4·5	5	6	7 cm	
Overall length	25	30	35	40	45 cm	
10 packs	**£3·20**	**4·10**	**4·50**	**5·50**	**6·20**	c
Pack	**£0·38**	**0·46**	**0·50**	**0·62**	**0·70**	

BU-442

BRUSHES, bottle, white nylon on galvanised wire.

Size No.	1	2	3	4	5	
Length of head	5	6	7·5	10	15 cm	
Dia. of head	4	4·5	5	6	7 cm	
Overall length	25	30	35	40	45 cm	
Ten	**£0·50**	**0·53**	**0·66**	**0·80**	**1·20**	c
Each	**£0·13**	**0·13**	**0·14**	**0·15**	**0·19**	

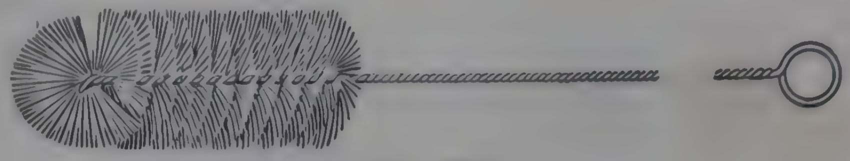


BU-460

BU-460

BRUSHES, burette, stiff white bristle on galvanised wire. In packs of 10.

Suitable for burette capacity	10	25	50	100 cm³	
Dia.	13	16	19	25 mm	
Overall length	50	60	75	90 cm	
10 packs	**£3·60**	**3·90**	**4·70**	**5·60**	c
Pack	**£0·42**	**0·45**	**0·52**	**0·62**	

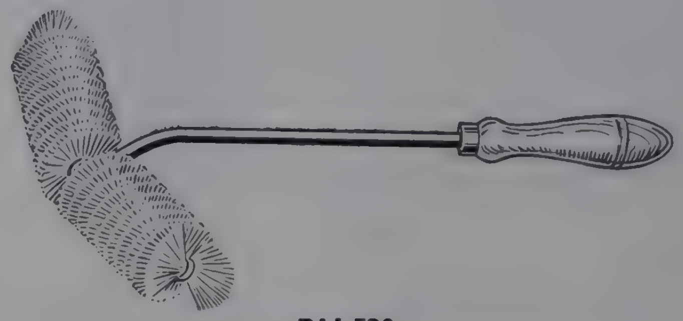


BU-480

BU-480

BRUSHES, cylinder, stiff white nylon, fan shaped end on strong galvanised wire.

Length of head	12	14 cm	
Dia. of head	6	7 cm	
Overall length	65	65 cm	
Ten	**£1·70**	**1·90**	c
Each	**£0·24**	**0·25**	

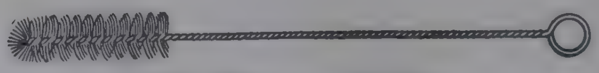


BU-520

BU-520

BRUSHES, flask, stiff white nylon, on galvanised wire with curved head, hinged joint and hardwood handle.

Length of head	10	17 cm	
Dia. of head	5	5 cm	
Suitable for flasks	1–3	over 3 litres	
Flask neck min. dia.	3	4·5 cm	
Ten	**£1·80**	**2·10**	c
Each	**£0·25**	**0·27**	



BU-550 BU-552

BU-550

BRUSHES, test tube, white fibre with fan shaped end on galvanised wire. In packs of 10.

For test tubes	10 to 12	16 to 25 mm	
10 packs	**£2·00**	**2·40**	c
Pack	**£0·26**	**0·30**	

BU-552

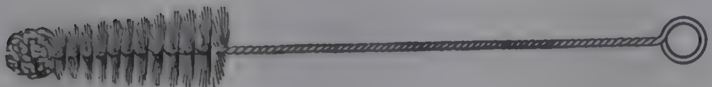
BRUSHES, test tube, white nylon with fan shaped end on galvanised wire. In packs of 10.

For test tubes	10 to 12	16 to 25 mm	
10 packs	**£2·30**	**2·90**	c
Pack	**£0·29**	**0·35**	

All items on this page normally available from stock.

BRUSHES

(continued)



BU-560 BU-562

BU-560

BRUSHES, test tube, white bristle with cotton yarn tip on galvanised wire. In packs of 10.

For test tubes	12 to 16	19 to 25 mm	
10 packs	£2·40	3·20	c
Pack	£0·30	0·38	

BU-562

BRUSHES, test tube, white nylon with cotton yarn tip on galvanised wire. In packs of 10.

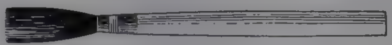
For test tubes	12 to 16	19 to 25 mm	
10 packs	£3·10	3·50	c
Pack	£0·37	0·41	

BU-580

BU-580

BRUSHES, tube, stiff white nylon set into centre of galvanised wire for cleaning tubes open at both ends. In packs of 10.

Dia.	3	6	12 mm	
Overall length	40	40	60 cm	
10 packs	£3·90	3·90	3·90	c
Pack	£0·45	0·45	0·45	

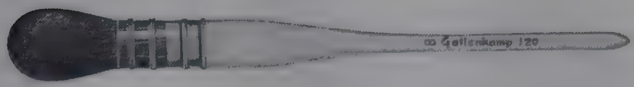


BU-600

BU-600

BRUSHES, round form, squirrel hair, in quill holders. In packs of 10.

Size	Small	Medium	Large	
10 packs	£4·30	5·90	8·00	c
Pack	£0·48	0·66	0·90	

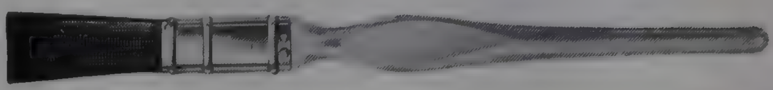


BU-610

BU-610

BRUSHES, round form, mop or dabber. Squirrel hair securely mounted in wooden handle.

Size No.	2	4	8	
Dia. approx.	6	9	15 mm	
Ten	£3·90	5·10	9·60	c
Each	£0·45	0·57	1·06	

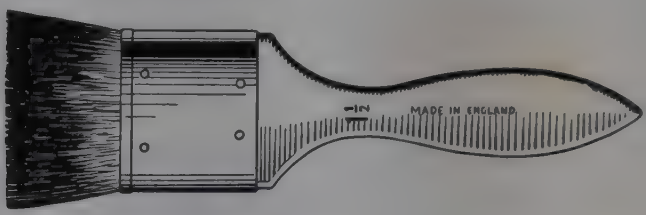


BU-615

BU-615

BRUSH, flat form, bristle, 12 mm wide for cleaning or dusting in confined spaces.

Ten £1·70 Each £0·24 c

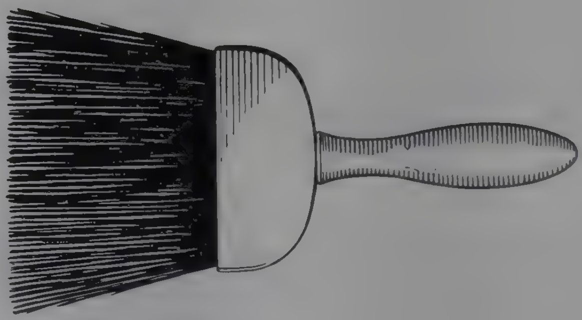


BU-620

BU-620

BRUSHES, flat form, squirrel hair, in metal mount on wooden handle.

Width	2·5	4	5 cm	
Ten	£4·10	5·70	7·40	c
Each	£0·46	0·64	0·82	



BU-640

BU-640

BRUSH, flat form, dusting, with soft bristles 10 cm long, in wooden handle.

Ten £5·50 Each £0·62 c

BU-680

BU-680

BRUSH, cleaning, polythene bristles set into toughened polystyrene handle. Overall length 26 cm.

Dozen £1·70 Each £0·21 c

All items on this page normally available from stock.

BUCKETS

BV-435

BUCKET, polypropylene, with handle but without pouring spout. Capacity 9 litres, dia. 24 cm, depth 24 cm. Each **£0·95** c

BV-440

BUCKET, rigid polythene, with pouring spout and polythene covered steel handle. Capacity 10 litres, graduated on inside of bucket, dia. 29 cm, depth 29 cm. Each **£1·85** c

BV-445

BUCKET, polythene, with pouring spout and strong wire handle with hand grip. Capacity 14 litres, dia. 31 cm, depth 25 cm ... ... Each **£0·90** c

***BV-470**

BUCKET, stainless steel, seamless, with easy-pour rim and handle. Capacity 12 litres, dia. 30 cm, depth 26 cm. Each **£5·75** c

BV-435

BV-440

BV-445

BV-470

BULBS, absorption see ABSORPTION APPARATUS
BULBS, rubber see RUBBER SUNDRIES
BUNSEN BURNERS see BURNERS

All above items normally available from stock.

The three A's of Automation in the Fuel Laboratory

AUTOBOMB

AUTOMATIC

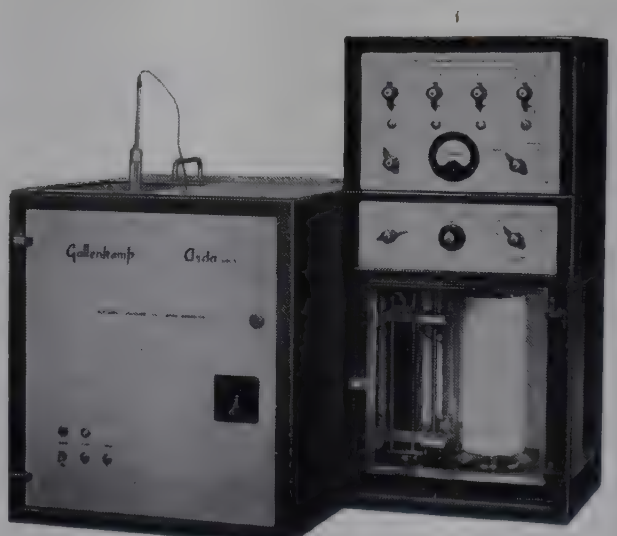
ADIABATIC BOMB CALORIMETER CB-100

Gallenkamp

ASDA

AUTOMATIC

STANDARD DISTILLATION APPARATUS PE-700



AUTOFLASH

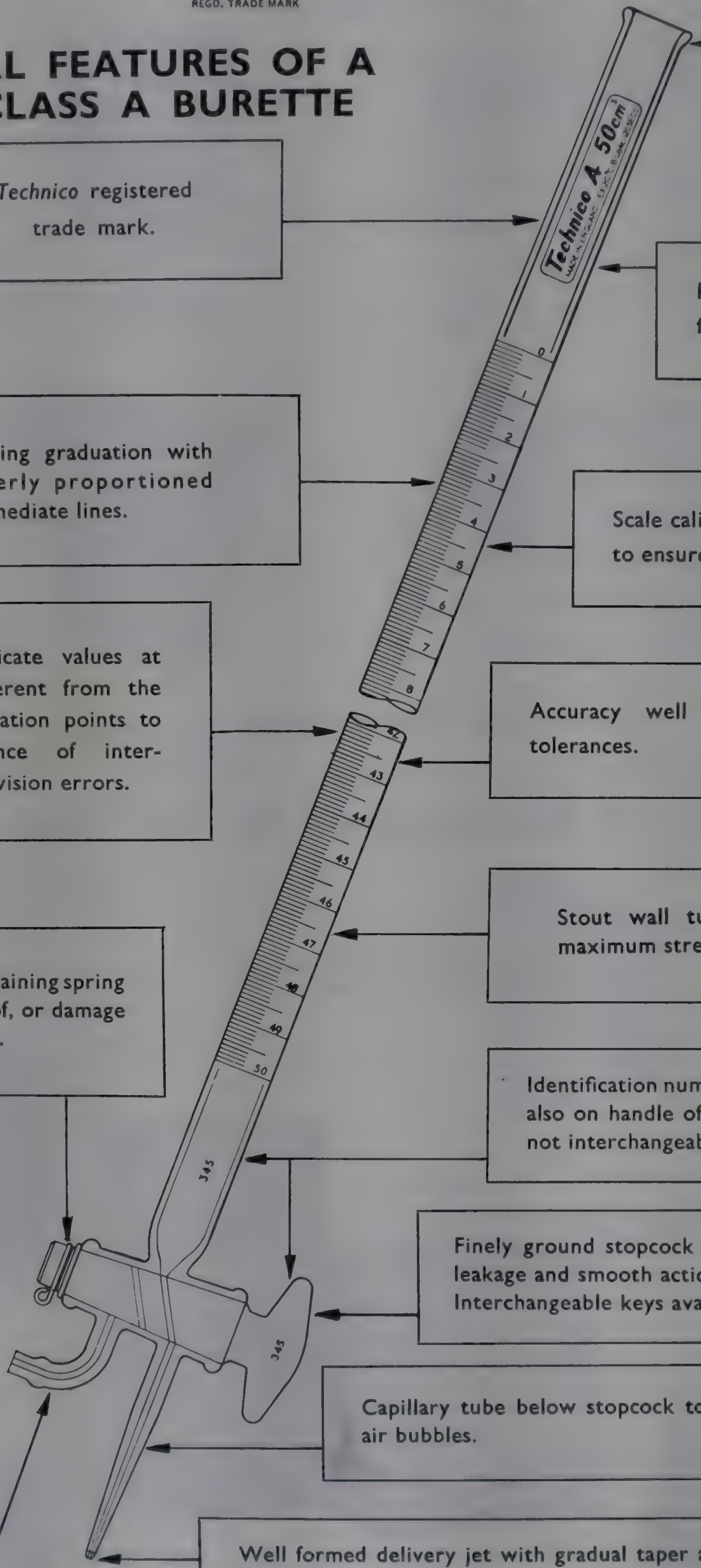
AUTOMATIC

PENSKY-MARTENS FLASH-POINT APPARATUS PF-070

Technico BURETTES

REGD. TRADE MARK

ESSENTIAL FEATURES OF A GOOD CLASS A BURETTE



Strongly formed reinforced rim.

Technico registered trade mark.

Full BS inscription including flow time.

Full ring graduation with properly proportioned intermediate lines.

Scale calibrated at five points to ensure uniform accuracy.

Works certificate values at 5 points different from the original calibration points to ensure absence of intermediate subdivision errors.

Accuracy well within BS tolerances.

Stout wall tubing for maximum strength.

Rust resistant retaining spring to prevent loss of, or damage to, stopcock key.

Identification number on tube also on handle of stopcock if not interchangeable.

Finely ground stopcock to ensure freedom from leakage and smooth action in use. Interchangeable keys available.

Capillary tube below stopcock to avoid trapped air bubbles.

Improved inlet bend to store flat and reduce breakage.

Well formed delivery jet with gradual taper and finely ground end and bevel, accurately timed to provide a fast outflow within BS tolerances.

When ordering specify *Technico* Volumetric Glassware.

Technico BURETTES

REGD. TRADE MARK

With permanent graduations and inscriptions in amber stain

- **General design, tolerance and performance based on BS 846**
- **Straight bore and double oblique bore stopcocks, some interchangeable**
- **Permanent graduations**
- **Works certified models available**

BURETTES WITHOUT STOPCOCK

BW-044

BURETTES, *Technico,* **Class B,** with nipple end, for use with pinchcock.

To deliver	25	50 cm^3	
Subdivided in	0·1	0·1 cm^3	
Dozen	**£7·40**	**8·20**	*a*
Each	**£0·70**	**0·78**	

BW-055

BURETTE PINCHCOCK, glass, with integral jet and length of silicone rubber tubing for connecting to a burette. Controlled delivery is obtained simply by squeezing the tubing at the ball of the pinchcock. In pack of 5 ... ... 10 packs **£9·00** Pack **£1·00** *b*

BURETTES WITH PTFE STOPCOCK

BW-064

BURETTES, *Technico,* **Class B,** with straight bore PTFE key. Requires no lubrication.

To deliver	5	10	25	50 cm^3	
Subdivided in	0·05	0·02	0·1	0·1 cm^3	
Each	**£1·75**	**2·05**	**1·85**	**1·85**	*a*

BURETTES WITH STRAIGHT BORE STOPCOCK

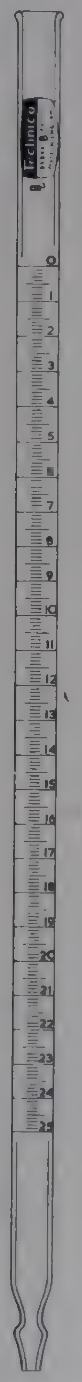
BW-084

BURETTES, *Technico,* **Class B,** with straight bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

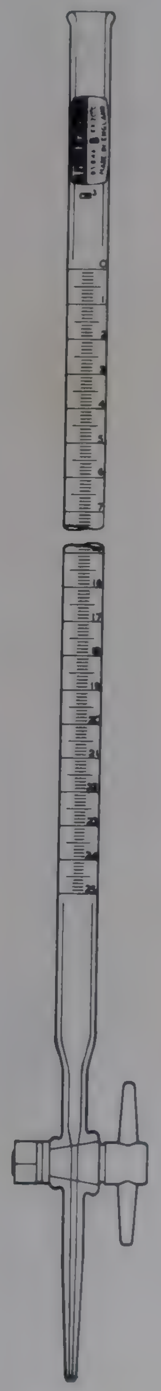
To deliver	1*	2*	5*	10	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·1	0·02 cm^3	
Dozen	**£11·40**	**11·40**	**12·20**	**9·80**	**15·50**	*a*
Each	**£ 1·06**	**1·06**	**1·14**	**0·92**	**1·45**	

To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**£10·80**	**17·00**	**11·40**	**14·80**	*a*
Each	**£ 1·00**	**1·60**	**1·06**	**1·40**	

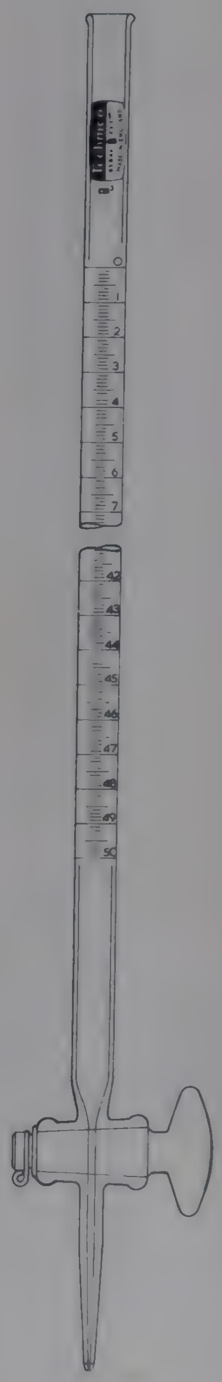
ST-650 Spare retaining springs. For price see entry in List No. sequence.



BW-044

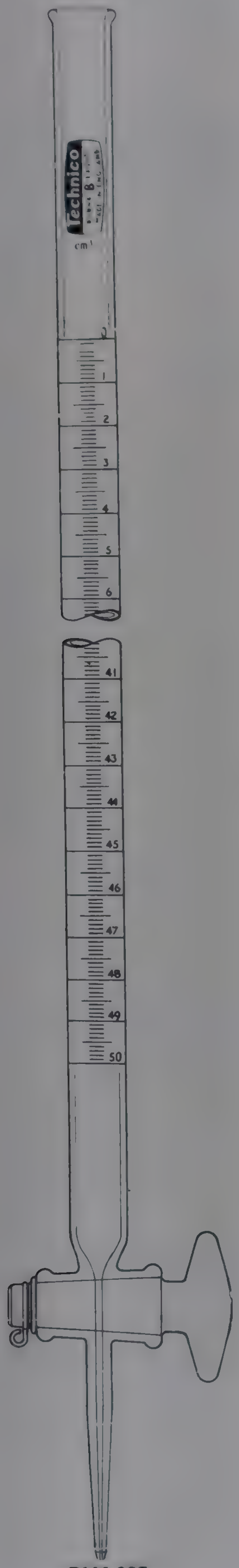


BW-064

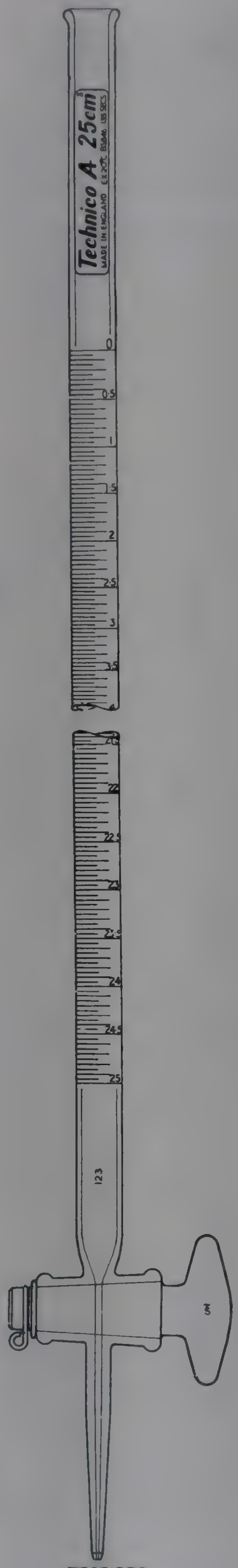


BW-084

All items on this page normally available from stock.



BW-085



BW-086
BW-087
BW-088

ST-440 Spare stopcock keys } see entries in
ST-650 Spare retaining springs } List No. sequence.

Technico
REGD. TRADE MARK

BURETTES WITH STRAIGHT INTERCHANGEABLE STOPCOCK

With permanent graduations and inscriptions in amber stain

BW-085

BURETTES, *Technico,* **Class B,** with **interchangeable** straight bore stopcock. The 5 and 10 cm^3 burettes are fitted with an enlarged tube at the top for easy filling.

To deliver	5	10	25	50 cm^3	
Subdivided in	0·05	0·02	0·1	0·1 cm^3	
Dozen	**£15·00**	**18·50**	**13·20**	**14·40**	a
Each	**£ 1·40**	**1·75**	**1·25**	**1·35**	

BW-086

BURETTES, *Technico,* **Class A,** with **interchangeable** straight bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Dozen	**£28·50**	**28·50**	**29·50**	**39·00**	a
Each	**£ 2·70**	**2·70**	**2·75**	**3·70**	
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	**£28·50**	**39·00**	**33·00**	**38·00**	a
Each	**£ 2·70**	**3·70**	**3·10**	**3·60**	

BW-087

BURETTES, *Technico,* **Class A,** with **interchangeable** straight bore stopcock, and **works certificate of examination** stating the volume delivered between zero and each of five points on the burette scale and the full scale delivery time for water. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Each	**£ 3·70**	**3·70**	**3·80**	**4·70**	a
To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Each	**£ 3·70**	**4·70**	**4·00**	**4·70**	a

BW-088

BURETTES, *Technico,* **BST stamped Class A,** with **interchangeable** straight bore stopcock, with BST certificate giving values at 5 test points. The 10 cm^3 burette is fitted with an enlarged tube at the top for easy filling.

To deliver	10	25	50 cm^3	
Subdivided in	0·02	0·05	0·1 cm^3	
Each	**£9·90**	**9·90**	**9·35**	a

Other sizes can be obtained with BST certificate to special order.

All items on this page normally available from stock.

Technico
REGD. TRADE MARK

BURETTES WITH DOUBLE OBLIQUE BORE STOPCOCK

With permanent graduations and inscriptions in amber stain

BW-134

BURETTES, *Technico,* **Class B,** with double oblique bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·1	0·02 cm^3	
Dozen	£14·80	14·80	15·50	12·60	19·00	a
Each	£ 1·40	1·40	1·45	1·18	1·80	

To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	£13·80	19·50	14·80	18·00	a
Each	£ 1·30	1·85	1·40	1·70	

BW-136

BURETTES, *Technico,* **Class A,** with double oblique bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Dozen	£33·00	33·00	34·00	43·00	a
Each	£ 3·10	3·10	3·20	4·00	

To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Dozen	£33·00	43·00	36·00	41·00	a
Each	£ 3·10	4·00	3·40	3·90	

BW-137

BURETTES, *Technico,* **Class A,** with double oblique bore stopcock, and **works certificate of examination** stating the volume delivered between zero and each of five points on the burette scale and the full scale delivery time for water. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·02 cm^3	
Each	£ 4·00	4·00	4·20	4·90	a

To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Each	£ 4·00	4·90	4·50	4·65	a

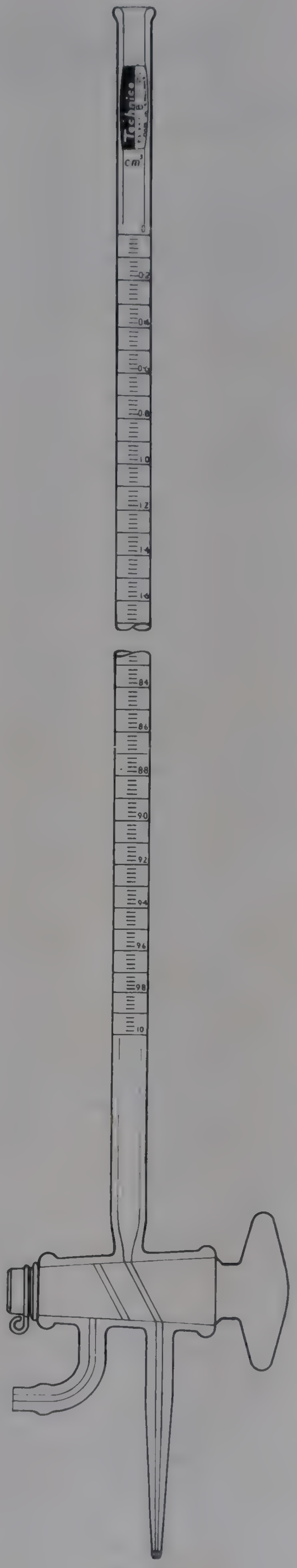
BW-138

BURETTES, *Technico,* **BST stamped Class A,** with double oblique bore stopcock with BST certificate giving values at 5 test points. The 10 cm^3 burette is fitted with an enlarged tube at the top for easy filling.

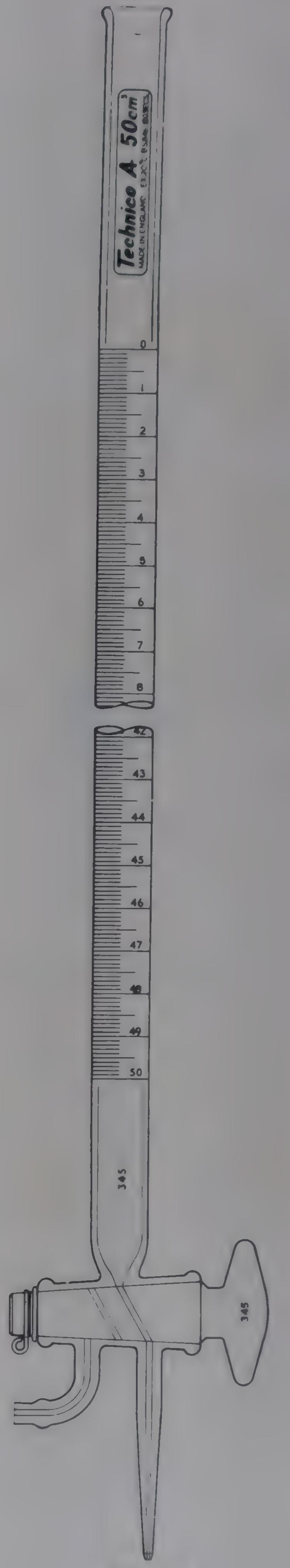
To deliver	10	25	50 cm^3	
Subdivided in	0·02	0·05	0·1 cm^3	
Each	£10·20	10·20	9·75	a

Other sizes can be obtained with BST certificate to special order.

ST-650 Spare retaining springs, see entry in List No. sequence.



BW-134



BW-136
BW-137
BW-138

All items on this page normally available from stock.

Technico BURETTES
REGD TRADE MARK

PLASTICS STOPCOCK

BW-184

BURETTE, *Technico*, **Class B,** with *T & M* diaphragm stopcock. Capacity 50 cm^3, subdivided in 0·1 cm^3. The stopcock is polythene with a neoprene diaphragm and can be dismantled for cleaning. Suitable for use with reagents which tend to seize glass stopcocks or dissolve stopcock lubricants.

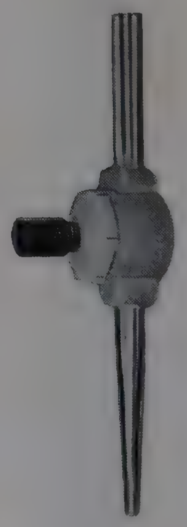
12 **£12·00** Each **£1·12** *c*

REPLACEMENT PARTS

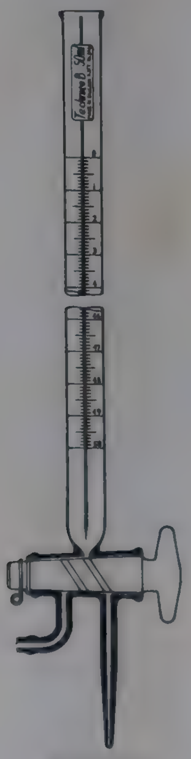
BW-185 **Burette,** with ground taper.
12 **£8·80** Each **£0·82** *a*

BW-186 **Burette jet,** with ground taper.
12 **£1·03** Each **£0·16** *a*

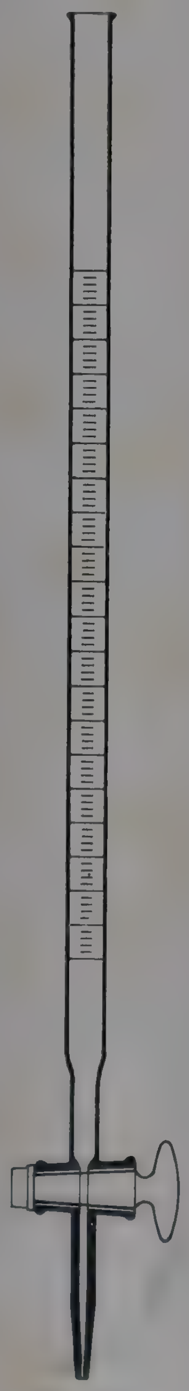
BW-187 **Burette stopcock,** polythene, complete with two interchangeable neoprene diaphragms.
12 **£2·20** Each **£0·25** *f*



Stopcock of BW-184



BW-294



BW-314

AMBER GLASS

BW-224

BURETTES, *Technico*, **Class B,** of low-actinic amber stained glass, with straight bore stopcock.

To deliver	10	25	50 cm^3	
Subdivided in	0·02	0·05	0·1 cm^3	
Dozen	**£25·50**	**25·50**	**17·50**	*a*
Each	**£ 2·40**	**2·40**	**1·65**	

SCHELLBACH BLUE LINE

With permanent graduations and inscriptions in amber stain

BW-284

BURETTES, *Technico*, **Class B,** with Schellbach blue and white enamel back, with straight bore stopcock.

To deliver	25	50 cm^3	
Subdivided in	0·1	0·1 cm^3	
Dozen	**£12·60**	**14·80**	*a*
Each	**£ 1·18**	**1·40**	

BW-294

BURETTES, *Technico*, **Class B,** with Schellbach blue and white enamel back, with double oblique bore stopcock.

To deliver	25	50 cm^3	
Subdivided in	0·1	0·1 cm^3	
Dozen	**£17·50**	**18·50**	*a*
Each	**£ 1·65**	**1·75**	

BW-304

BURETTE, *Technico*, **Class B,** with Schellbach blue and white enamel back, with double oblique bore stopcock and automatic zero. To deliver 50 cm^3, subdivided 0·1 cm^3 ... ... Each **£3·20** *a*

PYREX BRAND BURETTES

BW-314

BURETTES, *Pyrex brand* glass, **Class B,** with straight bore stopcock.

To deliver	5	10	10	25	50 cm^3	
Subdivided in	0·02	0·02	0·1	0·05	0·1 cm^3	
Std. pack qty.	2	2	2	2	2	
Std. pack	**£2·60**	**2·90**	**2·50**	**3·20**	**2·80**	*d*
Each	**£1·35**	**1·50**	**1·30**	**1·65**	**1·45**	

BW-316

BURETTES, *Pyrex brand* glass, **Class A,** with straight bore stopcock, and one-point test certificate.

To deliver	10	50 cm^3	
Subdivided in	0·02	0·1 cm^3	
Std. pack qty.	2	2	
Std. pack	**£5·60**	**6·45**	*d*
Each	**£2·90**	**3·40**	

All items on this page normally available from stock.

Technico BURETTES

REGD. TRADE MARK

DISPENSING

BW-334

BURETTES, dispensing, *Technico*, **Class B,** with straight bore stopcock.

To deliver	250	500	1000 cm³	
Subdivided in	1	5	10 cm³	
Dozen	**£24·00**	**27·50**	—	*a*
Each	**£ 2·25**	**2·55**	**4·65**	

BULB to BS 846, Part 2

BW-446

BURETTES, bulb, *Technico*, **Class A,** made to BS 846, Part 2, with interchangeable straight bore stopcock.

Total capacity	45	65	85	105 cm³	
Bulb capacity	20	40	60	80 cm³	
Scale range	25	25	25	25 cm³	
Subdivided in	0·05	0·05	0·05	0·05 cm³	
Each	**£4·85**	**4·85**	**4·85**	**4·85**	*a*

AUTOMATIC ZERO

BW-524

BURETTES, *Technico*, **Class B,** with automatic zero and double oblique bore stopcock.

To deliver	25	50	100 cm³	
Subdivided in	0·1	0·1	0·2 cm³	
Dozen	**£22·50**	**21·50**	**28·00**	*a*
Each	**£ 2·10**	**2·00**	**2·65**	

For similar burettes in Schellbach see BW-304.

BW-544

BURETTES, *Technico*, **Class B,** concentric tube pattern with automatic zero and nipple connection. With permanent graduation and inscriptions in amber stain. For use on a reservoir bottle.

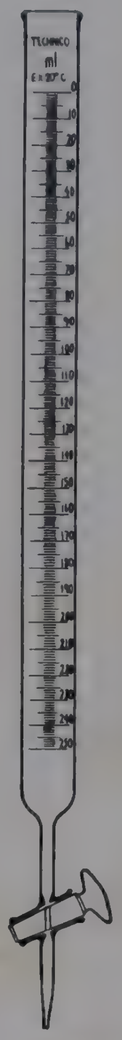
To deliver	10	20 cm³	
Subdivided in	0·1	0·1 cm³	
Dozen	**£8·20**	**8·40**	*a*
Each	**£0·76**	**0·78**	

WR-751 Burette, to deliver 10 cm³ as BW-544 but low actinic amber stained glass. For price see entry in List No. sequence.

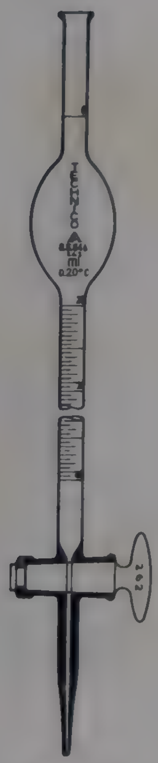
BW-554

BURETTES, *Technico*, **Class B,** concentric tube pattern BW-544, fitted to polythene bottle, complete with pinchcock BW-055. This assembly does not require a blowball as the burette is refilled by squeezing the bottle.

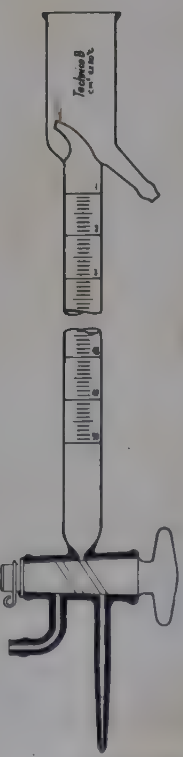
Burette capacity	10	20 cm³	
Subdivided in	0·1	0·1 cm³	
Bottle capacity	600	1200 ml	
Dozen	**£15·50**	**18·50**	*b*
Each	**£ 1·45**	**1·75**	



BW-334



BW-446



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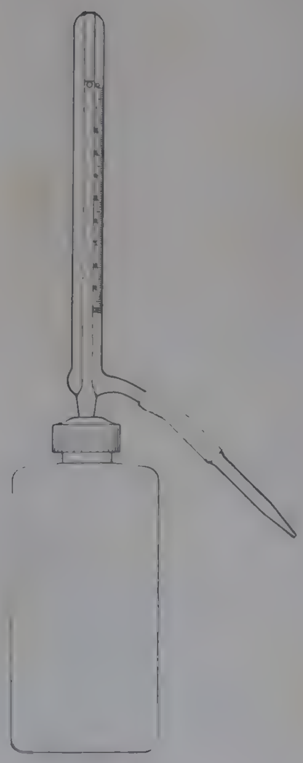
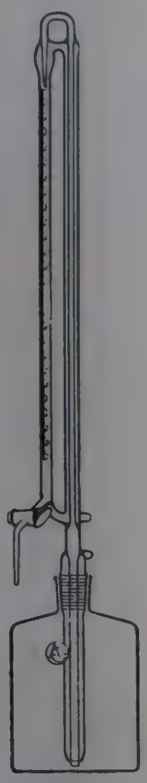


BW-554

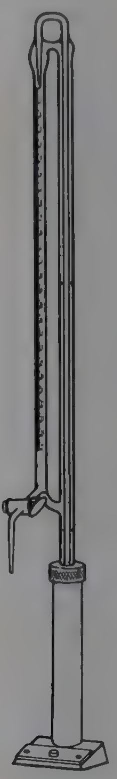
All items on this page normally available from stock.

Technico AUTOMATIC BURETTES

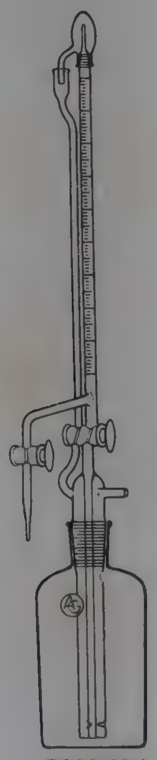
REGD. TRADE MARK



BW-584



BW-594



BW-634

BW-584

BURETTES, *Technico,* **Class B,** with automatic zero and interchangeable stopcock. The burette is of very robust design, using a coaxial filling tube system for either suction or pressure operation. The low volume of the system results in particularly fast filling when suction is used. With either suction or pressure control, filling is achieved when a small vent is closed with the fingertip. For use with a protective atmosphere, suction operation must be used, and facility is provided for attachment of a suitable guard tube (e.g. AB-600). Complete with reservoir bottle BW-655.

To deliver	10	25	50 cm^3	
Subdivided	0·05	0·1	0·1 cm^3	
Reservoir	500	2000	2000 ml	
Joint size	24/29	29/32	29/32	
Each	**£7·60**	**7·60**	**7·60**	*a*

BW-594

BURETTE, *Technico,* **Class B,** with automatic zero and interchangeable stopcock, for titration bench mounting. The filling system is of a robust coaxial design for suction operation. The burette is supplied complete with a special foot which also houses a label plate and press button valve. It fills rapidly when the valve is pressed and on release the zero level is automatically established. A suitable reservoir has to be installed below the bench with a small suction pump which may be used for filling as many as six burettes. Supplied complete with mounting foot, T-piece and connector. Capacity 50 cm^3, subdivided in 0·1 cm^3.

Each **£12·00** *a*

ACCESSORY

AF-414 **Air pump.** For details see entry in List No. sequence.

BW-634

BURETTES, micro, *Technico,* **Class B,** fully automatic. This design obviates the necessity of a hand or automatic release valve by using a special filling stopcock. When filling is completed the stopcock is reversed and automatically releases the pressure in the reservoir and returns the overflow. A separate interchangeable stopcock is used for operating the burette. This design is one of very few available for fully automatic operation on a micro-burette, and the zero arrangement is independent of surface tension. Fitted on a 500 ml reservoir bottle BW-655.

To deliver	2	5 cm^3	
Subdivided in	0·01	0·02 cm^3	
Each	**£8·80**	**9·60**	*a*

MICRO-BURETTE. See also BW-754 and BW-786 in List No. sequence.

Technico BURETTES

REGD. TRADE MARK

In addition to meeting the requirements of BS 846, *Technico* burettes embody many refinements and features of design—as shown on pages 86 and 87.

Useful information on burettes and other items of volumetric glassware with regard to methods of use, accuracy, cleaning and other matters will be found under the title VOLUMETRIC GLASSWARE.

All items on this page normally available from stock.

Technico AUTOMATIC BURETTES

REGD. TRADE MARK

BW-644

BURETTES, *Technico,* **Class B,** automatic, to BS 1428, Part D1, with automatic zero adjustment, interchangeable stopcock and fitted to 500 ml reservoir bottle BW-655. The burette and reservoir bottle are made of borosilicate glass, as recommended by Pregl. Complete with metal clip fittings for securing the burette into the neck of the bottle, two moisture guard tubes, jet for pinchclip, and one pair of springs JR-140 size 38 mm.

To deliver	5	10	25 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	**£7·60**	**7·60**	**7·60**	*a*

BW-646

BURETTES, *Technico,* **Class A,** automatic, as BW-644, but fitted with interchangeable stopcock in place of pinchclip.

To deliver	5	10	25 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	**£10·00**	**10·00**	**10·00**	*a*

BW-647

BURETTES, *Technico,* **Class A,** as BW-646, with **works certificate** giving values at 5 test points.

To deliver	5	10	25 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	**£11·80**	**11·80**	**11·80**	*a*

BW-655

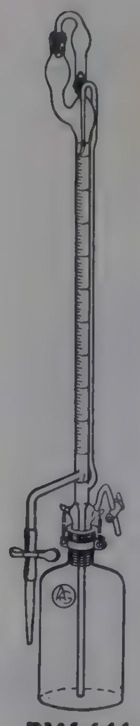
RESERVOIR BOTTLES, replacement, for automatic burettes BW-584, BW-634, BW-644, BW-646, and BW-647. Wide stable pattern with standard joint neck, borosilicate glass.

Capacity	500	2000 ml	
Socket	24/29	29/32	
Ten	**£7·80**	**11·00**	*a*
Each	**£0·88**	**1·25**	

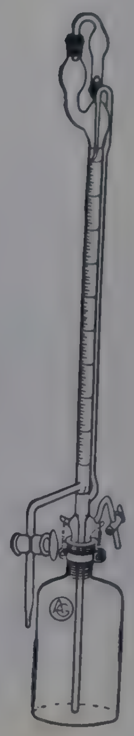
BW-754

BURETTES, micro, *Technico,* **Class B,** with interchangeable stopcocks, mounted on tripod base with filling funnel offset so that the burette tube is free for cleaning. Burette tube and filling funnel fitted with glass caps.

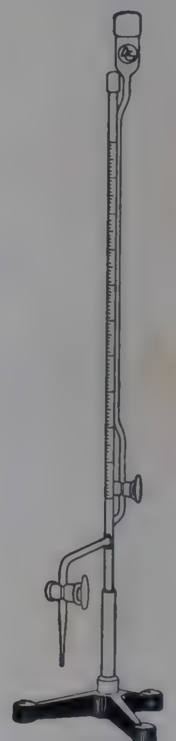
To deliver	2	5 cm³	
Subdivided in	0·01	0·02 cm³	
Each	**£6·00**	**6·00**	*a*



BW-644



BW-646
BW-647



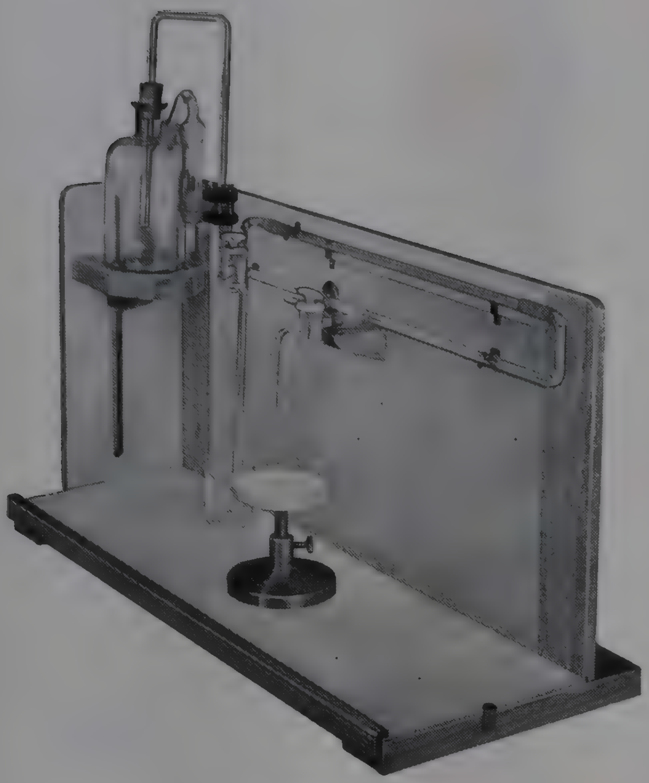
BW-754

BURETTES, Gas } see GAS ANALYSIS
Hempel }
Martins see CARBON DIOXIDE APPARATUS
Tutweiler see GAS ANALYSIS
TITRATION STANDS see ELECTROCHEMICAL ANALYSIS
TITRATION BENCHES see FURNITURE

All items on this page normally available from stock.

Technico MICRO BURETTE

REGD. TRADE MARK



BW-786

BURETTE, micro, Conway, *Technico,* **Class A,** to deliver $0{\cdot}25\ cm^3$, subdivided in $0{\cdot}001\ cm^3$, and capable of being read to $0{\cdot}00025\ cm^3$, the graduated tube being a length of precision bore tubing. The graduated burette tube is connected by plastics tubing to the remaining glass parts which are of borosilicate glass. Owing to the design of the burette and the relative capacities of burette tube and connecting tubes, the liquid which is delivered from the jet has been in contact only with borosilicate glass. The reservoir bottle is fitted with a guard tube. A ball and socket ground joint is fitted between the reservoir delivery tube and the burette stopcock tube to simplify cleaning, and minimise breakage. The burette is mounted on a wooden stand with white technolite base and a white background to the burette tube which enables accurate readings to be taken. The stand has an adjustable support for the reservoir bottle and an adjustable table under the delivery jet to take a micro-diffusion dish or a micro beaker. A full description of the burette and its method of operation is given in 'Microdiffusion Analysis and Volumetric Error' by Edward J. Conway, F.R.S., M.B., D.Sc.

BW-786

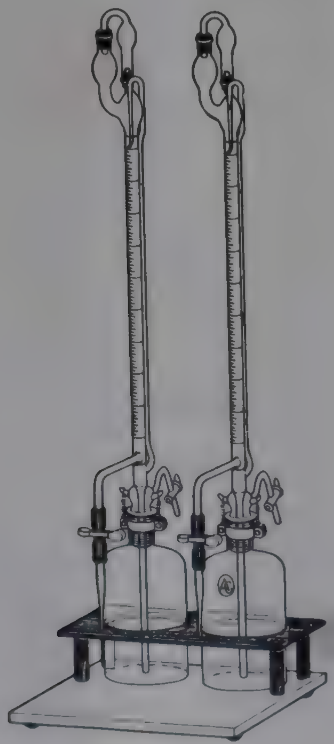
BURETTE, micro, Conway, as above specification.
Each **£25·50** *a*

REPLACEMENT PARTS

BW-787	**Burette tube,** graduated	Each	**£2·15**	*a*
BW-788	**Main connecting tube,** with 2 stopcocks and ball and socket joint	Each	**£3·80**	*a*
BW-789	**Reservoir delivery tube,** with ball joint.	Each	**£1·04**	*a*
BW-790	**Pressure balancing tube,** with stopcock, borosilicate glass...	Each	**£1·40**	*a*
BW-791	**Reservoir bottle,** with 2 necks ...	Each	**£1·55**	*a*
BW-792	**Moisture guard tube**	Each	**£0·58**	*a*

Micro-diffusion dishes for use with BW-786, see MD-120 et seq. in **MEDICAL SCIENCES.**

BURETTE ACCESSORIES



2× BW-644
in BW-881

BW-055

BURETTE PINCHCOCK, glass and silicone rubber. For details and price see entry in List No. sequence.

TJ-905

BURETTE/THERMOMETER READER, see entry in List No. sequence.

BW-880

BURETTE STAND, comprising heavy white technolite base with black plastics support for reservoir bottle, mounted on rubber feet. To fit 500 ml bottle. Suitable for burettes BW-634, BW-644, BW-646 and BW-647.
Each **£2·55** *b*

BW-881

BURETTE STAND, as BW-880, but to take 2 burettes.
Each **£3·30** *b*

BU-460

BURETTE BRUSHES. See entry in List No. sequence.

BURETTE STANDS, see also SM-210, SM-212, SM-230, SM-242, SM-260, SM-290 in List No. sequence.

All items on this page normally available from stock.

BURNERS

Burners of all types are listed, according to the nature of gas to be used, under the following sub-headings:

- TOWN (COAL) GAS
- NATURAL (METHANE) GAS
- LIQUIFIED PETROLEUM (BOTTLED) GAS
- LIQUID FUEL

SELECTION CHART

	Town (coal) gas	Natural (methane) gas	LPG†
Bunsen	BX-020 BX-030 BX-035 BX-040	BX-220 BX-230 BX-035 BX-240	BX-420 BX-430 BX-035
Meker	BX-045 BX-054 BX-060	BX-245 BX-254 BX-260	BX-445 BX-454 BX-460 BX-465 BX-470
Teclu	BX-075	BX-275	

	Town (coal) gas	Natural (methane) gas	LPG†
Fishtail	BX-077	BX-277	
Micro	BX-085 BX-095	BX-285	BX-485
Ring	BX-305	BX-305	
Amal			
Minor	BX-054	BX-254	BX-454
Major	BX-060	BX-260	BX-460
Maximus			BX-465

†Liquified petroleum gas

TOWN (COAL) GAS BURNERS

BX-020

BURNERS, Bunsen, for **coal gas,** fitted with air regulator.

Tube dia.	11	13 mm	
Ten	**£3·70**	**4·10**	c
Each	**£0·43**	**0·46**	

BX-030

BURNER, Bunsen, for **coal gas,** with 13 mm dia. burner tube, air regulator, and by-pass tube for relighting.
Ten **£21·50** Each **£2·40** c

BX-035

BURNER, Bunsen, 'All Gases' for use with **coal gas, methane, butane, propane** or mixtures of these gases. With adjustable jet, air regulator, fine adjustment valve and variable baffle. Overall height 15 cm.
Ten **£14·80** Each **£1·65** c

BX-020

BX-030

BX-035

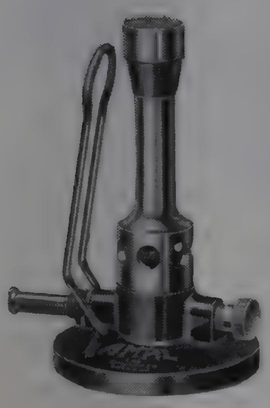
All items on this page normally available from stock.

TOWN (COAL) GAS BURNERS

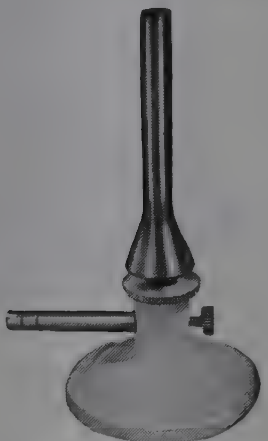
(continued)

BX-040

BX-045

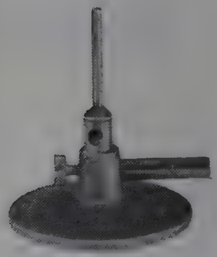


BX-054
BX-060



BX-075

BX-077



BX-085

BX-095

BX-040

BURNER, Bunsen, pipeline, for **coal gas,** with 11 mm dia. burner tube threaded $\frac{1}{8}$ in BSP for screwing into gas supply lines, air regulator and stopcock.
Ten **£11·80** Each **£1·35** *c*

BX-045

BURNERS, Meker, for **coal gas,** with refractory disk to produce a stable high temperature flame.

Disk dia.	18	22 mm	
Ten	**£20·00**	**23·50**	*c*
Each	**£ 2·25**	**2·65**	

BX-054

BURNER, Meker, *Amal* **Minor,** for **coal gas,** with adjustable needle valve. Head dia. 25 mm.
Each **£2·43** *m*

BX-060

BURNER, Meker, *Amal* **Major,** for **coal gas,** with adjustable needle valve. Head dia. 43 mm.
Each **£2·99** *m*

BX-075

BURNER, Teclu, for **coal gas,** with 13 mm dia. burner tube, air regulator and gas control needle valve.
Ten **£11·60** Each **£1·30** *c*

BX-077

BURNER, fishtail benchlight, for **coal gas,** 25 cm high. Suitable for working small diameter soda-lime glass tubing ... ... Ten **£4·50** Each **£0·50** *c*

BX-085

BURNER, micro, for **coal gas,** with 5 mm dia. burner tube and air regulator and gas control needle valve.
Ten **£5·80** Each **£0·64** *c*

BX-095

BURNER, micro, for **coal gas,** with air and gas regulators. The burner jet position is adjustable, and the burner height can be set from bench level up to maximum of 15 cm ... ... Each **£4·70** *c*

BX-305

BURNER, ring, for use with coal gas. See entry on opposite page.

All items on this page normally available from stock.

NATURAL (METHANE) GAS BURNERS

BX-220

BURNERS, Bunsen, for methane, fitted with air regulator.

Tube dia.	11	13 mm	
Ten	£6·40	7·00	c
Each	£0·70	0·78	

BX-230

BURNER, Bunsen, for methane, with 13 mm dia. burner tube, air regulator and by-pass tube for relighting.
Ten **£31·00** Each **£3·40** c

BX-035

BURNER, Bunsen, 'All Gases'. See entry in List No. sequence.

BX-240

BURNER, Bunsen, pipeline, for methane. With 11 mm dia. burner tube, threaded $\frac{1}{8}$ in BSP for screwing into gas supply lines, air regulator and stopcock.
Ten **£14·00** Each **£1·55** c

BX-245

BURNER, Meker, for methane. With refractory disk to produce a stable high temperature flame. Disk dia. 22 mm ... ... Ten **£32·00** Each **£3·60** c

BX-254

BURNER, Meker, *Amal* **Minor, for methane** at 6 in W.G. With fixed No. 55 jet and one each Nos. 50, 60 and 70 jets. Head dia. 25 mm ... ... Each **£2·55** *m*

BX-260

BURNER, Meker, *Amal* **Major, for methane** at 6 in W.G. With fixed No. 160 jet and one each Nos. 150, 170 and 180 jets. Head dia. 43 mm ... ... Each **£3·14** *m*

BX-275

BURNER, Teclu, for **methane** with 13 mm dia. burner tube, air regulator and gas control needle valve.
Ten **£14·80** Each **£1·65** c

BX-277

BURNER, fishtail benchlight, for **methane,** 25 cm high. Suitable for working small diameter soda-lime glass tubing ... ... Ten **£7·40** Each **£0·82** c

BX-285

BURNER, micro, for methane. With 8 mm dia. burner tube and air regulator and gas control needle valve.
Ten **£8·80** Each **£0·98** c

BX-305

BURNER, ring, for use with **methane or coal gas.** Fitted with injector for methane and supplied with alternative injector for coal gas. Mounted on vitreous enamelled heat deflecting base. With air and gas regulators. Overall dimensions 30 × 21 × 8 cm high.
Each **£3·30** c

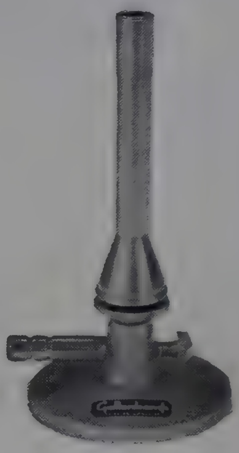
BX-220

BX-230

BX-240

BX-245

BX-254
BX-260


BX-275

BX-285

BX-277

BX-305

All items on this page normally available from stock.

LIQUIFIED PETROLEUM (BOTTLED) GAS BURNERS

BX-420

BX-430

BX-420

BURNERS, Bunsen, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With air regulator.

Tube dia.	11	13 mm	
Ten	**£6·60**	**7·00**	*c*
Each	**£0·74**	**0·78**	

BX-430

BURNER, Bunsen, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With 13 mm dia. burner tube, air regulator and by-pass tube for relighting.

Ten **£31·00** Each **£3·40** *c*

BX-035

BURNER, Bunsen, 'All Gases'. See entry in List No. sequence.

BX-445

BX-445

BURNERS, Meker, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With refractory disk to produce a stable high temperature flame.

Disk dia.	18	22 mm	
Ten	**£21·50**	**25·50**	*c*
Each	**£ 2·40**	**2·80**	

BX-454

BURNER, Meker, *Amal* **Minor** for **butane** and **propane** at approx. 11 in W.G. With fixed No. 25 jet and one each No. 20, 30 and 35 jets. Head dia. 25 mm.

Each **£2·55** *m*

BX-460

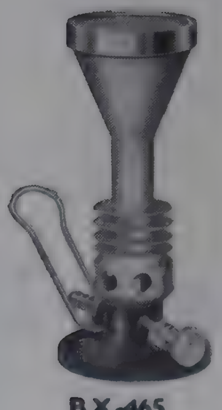
BURNER, Meker, *Amal* **Major** for **butane** and **propane** at approx. 11 in W.G. With fixed No. 40 jet and one each No. 30, 50 and 60 jets. Head dia. 43 mm.

Each **£3·14** *m*

BX-465

BURNER, Meker, *Amal* **Maximus,** for **butane** and **propane** at approx. 11 in W.G. Designed to give an equivalent amount of heat as the *Amal* Major BX-060 burning coal gas. With three fixed No. 50 jets and needle valve. Head diameter 60 mm ... ... Each **£7·39** *m*

BX-454
BX-460


BX-465

ASBESTOS BOARD	see AR-470 *et seq.*
BLOWPIPES	see BR-150 *et seq.*
GAUZES	see GK-100 *et seq.*
TRIANGLES	see TV-540 *et seq.*
TRIPODS	see SM-910 *et seq.*

All items on this page normally available from stock.

LIQUIFIED PETROLEUM (BOTTLED) GAS BURNERS

(continued)

***BX-470**

BURNER, Meker, *Labogas,* for use with expendable **butane** cartridge. Provides flame temperatures up to 1100°C and consumes approx. 60 g/hour at full flame. Overall height 19 cm, flame dia. 20 mm. Complete with air and flame adjustment valves and clip to hold cartridge, but **supplied without cartridge.**

Each **£2·47** *m*

ACCESSORY

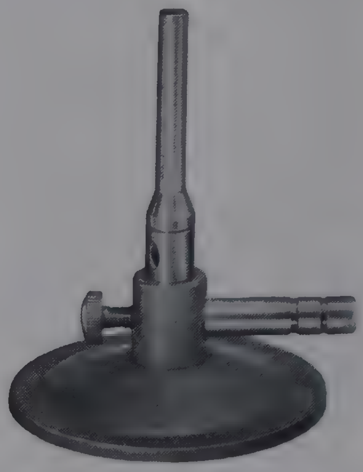
***BX-472** **Butane cartridge,** 10 cm high × 9 cm dia., containing 200 g of butane. In pack of three.
12 packs **£12·00** Pack **£1·12** *m*

BX-485

BURNER, micro, for **butane** at 11 in W.G. and **propane** at 13 to 14 in W.G. With 8 mm dia. burner tube and air regulator and gas control needle valve.

Ten **£8·80** Each **£0·98** c

BX-470 with BX-472



BX-485

LIQUID FUEL BURNERS

BX-750

BURNERS, for **methylated spirit,** with porcelain wick holder, wick and ground-on cap to prevent evaporation when not in use.

Capacity	60	125 ml	
Ten	**£3·40**	**3·50**	c
Each	**£0·40**	**0·41**	

BX-750

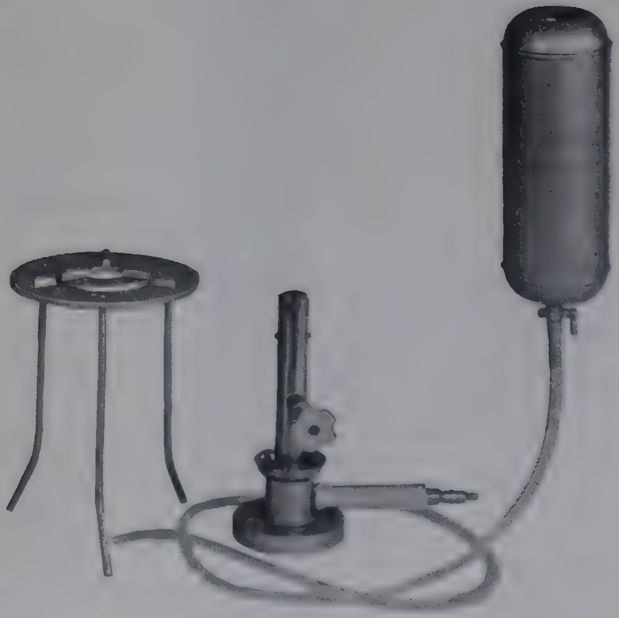
BX-800

BURNER, Bunsen, Barthel type, for use with methylated spirit. Suitable for the Naked Flame Test described in BS 738 and the Spirit Burner Test described in BS 3289, 3497 and 3503. Complete with 1 litre capacity fuel reservoir, 1·5 metres of flexible transparent plastics tubing, tripod with removable centre piece, one each fine and coarse gauzes, pricker and instructions.

Each **£15·50** c

REPLACEMENT PART

BX-804 **Burner only** ... ... Each **£10·00** c



BX-800

All items on this page normally available from stock.

USEFUL EQUIVALENTS AND CONVERSION FACTORS

Selected from BS 350 and BS 3763, with abbreviations in accordance with BS 1991, these figures are in accordance with the International System (SI) units and with the U.K. Weights and Measures Act of 1963. Figures shown in bold type are *exact equivalents.*

LINEAR MEASURE

Angström unit (Å). **1×10^{-10}m**; **$3 \cdot 937 \times 10^{-9}$** in.

Centimetre (cm). **0·3937** in; **0·032 808 4** ft.

Foot (ft). **0·3048** m; 1·8939 $\times 10^{-4}$ mile.

Inch (in). **0·0254** m; 0·027 778 yd.

Kilometre (km). 0·621 371 mile; 1093·613 yd.

Metre (m). **1×10^{10}** Å; **39·37** in; **3·280 84** ft; 1·093 613 yd.

Micrometre (micron) (μm). **1×10^{-6}** m; **$3 \cdot 937 \times 10^{-5}$** in.

Mile. **1·609 344** km.

Yard (yd). **0·9144** m; 5·681 82 $\times 10^{-4}$ mile.

SQUARE MEASURE

Acre. **4,840** yd^2; **43,560** ft^2; 4,046·86 m^2.

Hectare. **1×10^4** m^2; 2·471 05 acres.

Square centimetre (cm^2). 0·155 000 in^2.

Square foot (ft^2). **929·0304** cm^2.

Square inch (in^2). **6·4516** cm^2.

Square metre (m^2). 1·195 992 yd^2; 1550·00 in^2.

Square yard (yd^2). **0·836 127 36** m^2.

CUBIC MEASURE AND CAPACITY

Cubic centimetre (cm^3). 0·061 023 7 in^3; 16·8936 minims; 0·035 195 fl. oz.

Cubic decimetre (dm^3). 61·0237 in^3; 35·195 fl. oz; 1·759 75 pint; 0·219 969 UK gal.

Cubic foot (ft^3). 0·028 316 8 m^3; 6·228 84 gal.

Cubic inch (in^3). **16·387 064** cm^3; 0·576 74 fl. oz.

Cubic metre (m^3). 219·969 gal; 1·307 95 yd^3; 35·3147 ft^3; 61,023·7 in^3.

Fluid drachm (fl. dr). **0·125** fl. oz; **60** minims; 3·551 63 cm^3; 0·216 734 in^3.

Fluid ounce (fl. oz). **8** fl. dr; **480** minims; 28·4130 cm^3; 1·733 87 in^3.

Gallon (UK) (gal). 4·546 09 $\times 10^{-3}$ m^3; **160** fl. oz; 277·420 in^3; 0·160 544 ft^3.

Litre The litre was redefined by the Conférence Générale des Poids et Mesures in October 1964 as being a synonym for the cubic decimetre. To avoid confusion with the former equivalent of 1000·028 cm^3 it is recommended that the term litre (together with the subdivisions millilitre and microlitre) should not be associated with measurements of high precision.

Minim. 0·059 193 8 cm^3; 2·083 33 $\times 10^{-3}$ fl. oz.

Pint (pt). **0·125** gal; **20** fl. oz; 568·262 cm^3. 34·6775 in^3.

WEIGHT

Drachm (apoth or troy) (dr). **60** gr; 2·1943 dr (avoir); **3·887 934 6** g.

Dram (avoir) (dr). **27·343 75** gr; 0·455 73 dr (apoth or troy); 1·771 845 g.

Grain (gr). **0·064 798 91** g.

Gramme (g). 15·4324 gr; 0·035 274 0 oz (avoir); 0·032 150 7 oz (troy).

Kilogramme (kg). 2·204 622 6 lb (avoir).

Ounce (oz) (avoir). 0·911 458 oz (troy); **437·5** gr; 28·349 523 g.

Ounce (oz) (apoth or troy). 1·097 14 oz (avoir); **480** gr; 31·103 468 g.

Pound (lb) (avoir). 1·215 28 lb (troy); **16** oz (avoir); **7000** gr; **0·453 592 37** kg.

Pound (lb) (apoth or troy). 0·822 857 lb (avoir); **12** oz (troy); **5,760** gr; 0·373 242 kg.

Ton (t). **2,240** lb (avoir); 1016·047 kg.

Tonne (metric ton). **1,000** kg; 0·984 207 t; 2,204·6226 lb (avoir).

VELOCITY

Metre per second (m/s). **3·280 84** ft/s.

Foot per second (ft/s). **0·3048** m/s; **1·097 28** km/hr; 0·681 818 mile/hr.

Kilometre per hour (km/hr). 0·911 344 ft/s; 0·277 778 m/s.

Mile per hour **0·447 04** m/s. 1·466 67 ft/s.

PRESSURE

Atmosphere (atm). **760** mmHg; 29·9213 in Hg; **101 325·0** N/m^2; 1·033 23 kgf/cm^2; 14·6959 lbf/in^2.

Bar **1×10^5** N/m^2; 0·986 923 atm; 750·062 mmHg; 29·5300 in Hg; 1·019 72 kgf/cm^2; 14·5038 lbf/in^2.

Kilogramme force per square centimetre (kgf/cm^2). **98 066·5** N/m^2; **0·980 665** bar; 14·2233 lbf/in^2.

Newton per square metre (N/m^2) **1×10^{-5}** bar; 1·019 72 $\times 10^{-5}$ kgf/cm^2; 1·450 38 $\times 10^{-4}$ lbf/in^2.

Pound force per square inch (lbf/in^2) 6894·76 N/m^2; 6·894 76 $\times 10^{-2}$ bar; 7·0307 $\times 10^{-2}$ kgf/cm^2.

Torr **1/760** atm; **1** mmHg; 1·333 22 mbar.

DENSITY

Kilogramme per cubic metre (kg/m^3). 0·062 427 8 lb/ft^3.

Pound per cubic foot (lb/ft^3). 16·0185 kg/m^3.

CALCULATING SLIDE RULES

CA-510
SLIDE RULE, *Unique*, **pocket,** 125 mm. A thin all plastics rule. With A, B, C, D, RC, LL_2, LL_3, S and T scales. Supplied in a sheath-type plastics case with instructions ... ... Each **£0·73** *m*

CA-515
SLIDE RULE, *Unique*, 250 mm. A general purpose rule with scales faced in non-fading plastics. Scales A, B, C, D, LL_2, LL_3, S and T. Supplied in durable case with instructions ... ... Each **£1·00** *m*

CA-519
SLIDE RULE, *PIC* **Standard, No. P281,** 250 × 50 mm. A precision engraved plastics rule with scales A, C, CF, D, DF, RC, F, cm and inches. Supplied in strong case with instructions ... ... Each **£2·10** *m*

CA-521
SLIDE RULE, *PIC* **Student, No. P271,** 250 × 50 mm. A precision engraved plastics rule with scales A, B, C, D, L, LL_2, LL_3, RC, S, ST, T and differential trigonometrical group. Supplied in strong case with instructions. Each **£2·10** *m*

CA-531
SLIDE RULE, *PIC* **Standard Log Log, No. P241,** 250 × 50 mm. A precision engraved plastics rule with scales A, B, C, D, L, LL_2, LL_3, F, RC, S, ST, T, cm, inches and differential trigonometrical group. Supplied in strong case with instructions ... ... Each **£3·90** *m*

CA-536
SLIDE RULE, *PIC* **Comprehensive Double Face, No. P221,** 250 × 50 mm. A precision engraved plastics rule with scales A, B, C, CF, D, DF, F, L, LL_1, LL_2, LL_3 and three scales of e to corresponding negative powers, RC, RD, S, ST, T, scales of Pythagoras for vector analysis and differential trigonometrical group. Supplied in strong case with instructions ... ... Each **£4·20** *m*
There are many other types of *Unique* and *PIC* slide rules. Full details on request.

HV-260
SLIDE RULE, relative humidity, for calculations from readings of wet and dry bulb hydrometers. For price and details see entry in List No. sequence.

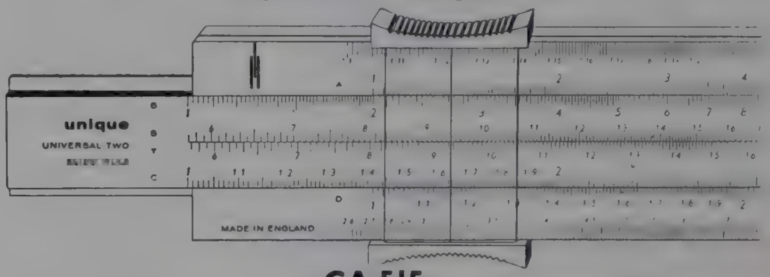
***CA-550**
SLIDE RULE, Nestler Chemists, 250 mm long. A precision comprehensive rule for chemists with scales giving atomic and molecular weights in addition to C, D, L and RC scales. Formulæ of elements and radicals are marked on the face and back of the slide, whilst elements and compounds to be determined are marked on the stock. In addition there is a table of atomic weights and molecular weights of compounds and radicals on the back of the rule. Very useful for rapid calculations connected with analysis and synthesis. Supplied in case with cursor and instructions ... ... Each **£3·97** *m*

CA-580
CALCULATOR, Otis King Model K, equivalent to a 168 cm slide rule, comprising two cylinders, one rotating and sliding within the other, with spiral scales on both and a cursor tube carrying an engraved arrow at each end. Maximum dia. 33 mm, closed length 150 mm, open length 255 mm. Supplied in case with instructions and table of decimal equivalents of parts of one £ and fractions of an inch ... ... Each **£4·13** *m*

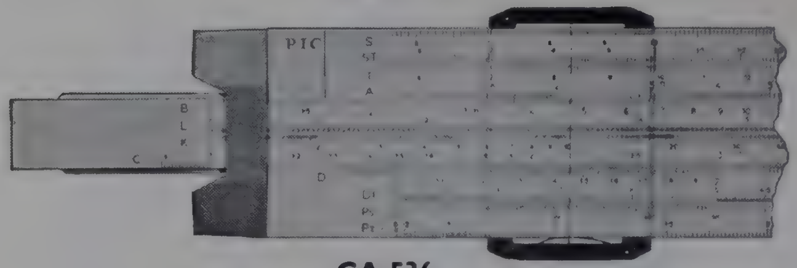
CA-590
CALCULATOR, Fuller No. 1, comprising two cylinders, one rotating and sliding within the other, with a spiral logarithmic scale 1270 cm long on outer cylinder. Two index arms can be moved, simultaneously if so required, to any point. An accuracy of greater than 1 in 10,000 is easily obtainable with practice. Maximum dia. 83 mm, overall length 425 mm. Supplied in mahogany case with instructions ... ... Each **£31·45** *m*

The following abbreviations are used to simplify specifications of slide rules:

A — scale of squares on stock; x_D^2
B — scale of squares on slide; x_C^2
C — basic scale on slide; x_C
D — basic scale on stock; x_D
CF — π displaced C scale; πx_C
DF — π displaced D scale; πx_D
F — cubic scale; x^3
L — logarithmic scale; $\log_{10} x$
LL_1 — log-log scale; $e^{0\cdot01x}$
LL_2 — log-log scale; $e^{0\cdot1x}$
LL_3 — log-log scale; e^x
RC — reciprocal of C scale; $1/x_C$
RD — reciprocal of D scale; $1/x_D$
S — sine and co-sine scale
ST — scale for lower angle range
T — tangent and co-tangent scale



CA-515



CA-536

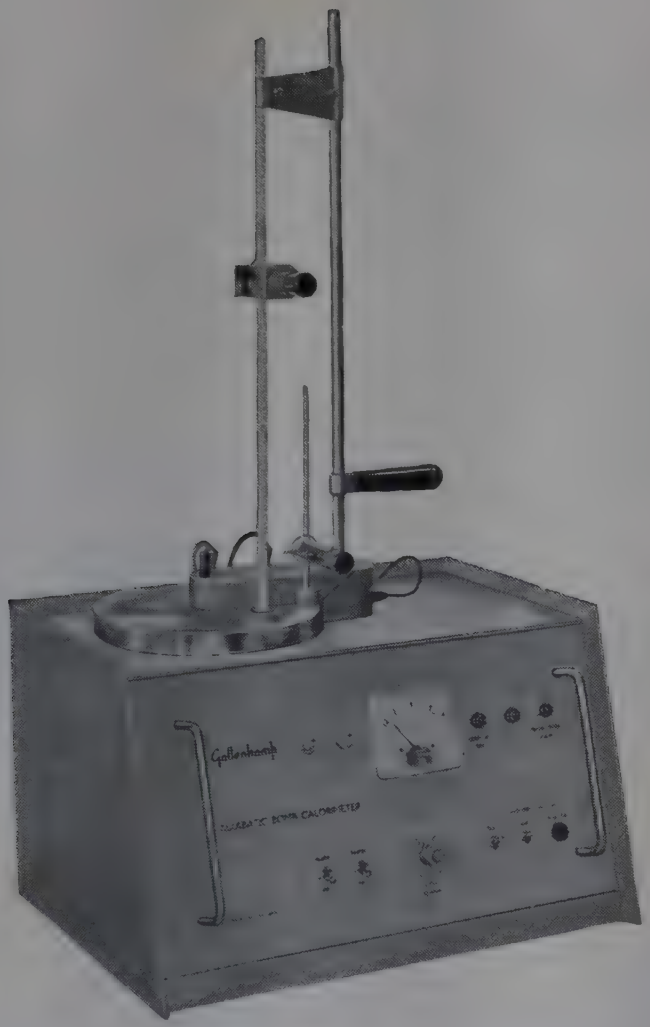
CA-580

CA-590

All items on this page normally available from stock.

Gallenkamp AUTOBOMB

An Automatic Adiabatic Bomb Calorimeter for the rapid and accurate determination of calorific values of



CB-100

- COAL
- COKE
- OTHER FUELS
- PETROLEUM PRODUCTS
- FOODSTUFFS AND BIOLOGICAL MATERIALS

Suitable for BS 1016, BS 3804, IP 12, ASTM D240, DIN 51708, DIN 51785.

- **Top cover assembly on telescopic lift—no dismantling between tests.**
- **No handling of calorimeter thermometer—risk of breakage negligible.**
- **Instantaneous heating for accurate response.**
- **High speed water circulation through jacket and cover for temperature uniformity.**
- **Console encloses calorimeter and all control circuits, cables and water connections.**
- **Firing wire continuity tester circuits give visual indication of successful firing.**
- **Swing down control panel for immediate access for servicing.**
- **Printed circuit for reliability.**
- **Includes exclusive illuminated reader/vibrator for thermometer.**

OPERATION

The automatic adiabatic system employed in the Autobomb prevents exchange of heat between the calorimeter and jacket by ensuring that at every instant throughout the test, the jacket is at the same temperature as the calorimeter vessel which it wholly encloses. Thus, the system eliminates both the tedium of a large number of thermometer readings and the calculation of a cooling correction.

The circuit of the control system is basically simple and therefore reliable.

The overall design reduces manipulation to a minimum and avoids unsuccessful attempts at firing. Both the determination of the effective heat capacity (cal/degC) of the calorimeter and bomb and the determination of the calorific values (cal/g or BTU/lb) of samples are rapid and accurate.

Having been filled and prepared, the bomb is placed in the calorimeter vessel which has previously been filled with water and the jacket lid is lowered to put into position **in one single movement** the calorimeter cover, calorimeter stirrer, thermometers, thermistor assemblies and bomb firing connector. When the connector is pressed home the 'READY TO FIRE' lamp lights.

When the apparatus has stabilised, the firing switch is depressed and after a suitable period the final equilibrium temperature is noted and checked. Preparation for the next test involves merely switching off the heater, raising the jacket lid with its mounted components and swinging it to the rear, and removing the bomb.

Calorimeter thermometer. This is an expensive item so that its safe mounting on the jacket lid, without the need for removal between tests is particularly important in reducing breakage risks.

The illuminated reader/vibrator, which facilitates the taking of accurate thermometer readings, is controlled by a push-button on the front panel.

Gallenkamp AUTOBOMB

(continued)

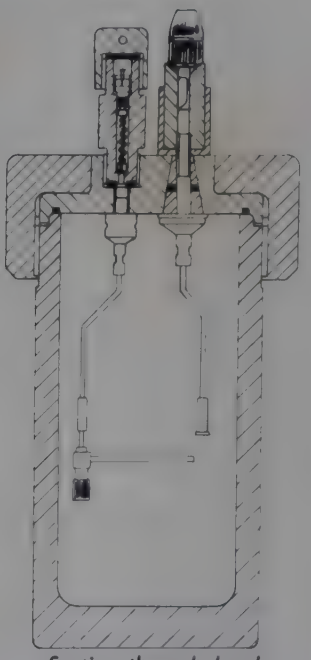
DESIGN DETAILS

Bomb. The capacity is approximately 300 ml. The body and cap are forged stainless steel bar to BS 1506-845 Grade B. This is a stabilised austenitic steel which has a high corrosion resistance and is not subject to intercrystalline corrosion. The cap is secured by a locking ring machined from rolled aluminium bronze bar. The joint between the body and cap is made by a toroidal sealing ring which enables a perfectly gas-tight seal to be effected by hand tightening only. The oxygen filling point is fitted with a Schrader valve and the union between the bomb and filling tube, sealed by a toroidal sealing ring, is also designed for tightening by hand. Avoidance of the use of tools results in less wear to parts of the bomb. Two stainless steel electrodes are fitted to the cap; one has a ring-shaped support for flanged crucibles and is electrically connected to the cap and the other is insulated by means of a laminated plastics bush.

Every bomb is subjected to a hydraulic pressure test at 4500 lbf/in^2 maintained for 10 minutes, and a certificate of test is issued. The certificate gives full details of the mechanical properties and chemical composition of the materials used in the construction of the bomb.

Bomb firing circuit. This circuit is fed from an earthed winding on the mains transformer. It includes a fuse, a test circuit and a lamp which shows when the firing wire has fused. A remote firing switch accessory is available and is easily connected.

Calorimeter vessel. This is made of stainless steel, polished outside, and two litres of water just cover the bomb. Three metal pegs are fixed inside to support the bomb a sufficient distance from the bottom to allow free circulation of water round the bomb, and a wire lifting handle facilitates assembly into the water jacket.



Section through bomb

CB-200

Console and water jacket. All control circuits are mounted on the swing-down front panel for ease of inspecting and servicing. They comprise an a.c. bridge, printed circuit amplifier, heater relay circuit, bomb 'test', 'ready for firing' and 'fire' systems and all associated switches, fuses indicator lamps and meter.

The jacket and lid are constructed of stainless steel, polished inside.

The calorimeter vessel is located inside the water jacket by a spacer which has the dual purpose of minimising thermal contact between the two and at the same time provides an adequate return path for the bomb firing circuit. The calorimeter is stirred by an independent motor mounted on the water jacket cover. A heat break in the stirrer shaft prevents conduction of heat to or from the calorimeter.

CB-100

AUTOMATIC ADIABATIC BOMB CALORIMETER, *Gallenkamp* **AUTOBOMB.**

Outfit comprising one each of the following:—

CB-110	Console (includes thermometer reader/vibrator)	CB-230	Tube assembly
CB-200	Bomb	CB-235	Needle valve
CB-215	Bomb stand	CB-234	Two spanners
CB-220	Pressure gauge on stand	CB-351	Pad of report sheets
CB-225	Tube assembly	CB-353	Instructions manual
		GD-420	Combination tool

For 200/250V 50 Hz single phase supplies ... ... Outfit **£433·00** *b*

For 110/130V 50 or 60 Hz single phase supplies ... ... Outfit **£437·00** *bN*

When ordering please state voltage and frequency of supply.

Thermometers, crucibles and firing wire are not included in the above outfit because several alternatives are available. Details of these items, together with other accessories and spare parts kits (both CB-115 and CB-203 are recommended) are listed on pages 104 and 105.

Items on this page normally available from stock except those coded *N.*

Gallenkamp AUTOBOMB

(continued)

COMPONENTS

CB-110

CONSOLE, comprising calorimeter vessel with stirrer, adiabatic water jacket with heater, circulating pump control circuits, as specification, in outer case, together with a thermometer reader/vibrator. Overall dimensions with cover raised 51·5×40×109 cm high.

Without bomb, thermometers, accessories or spare parts but including instruction manual.

For 200/250V 50 Hz single phase supplies. Each **£315·00** *b*

For 110/130V 50 or 60 Hz single phase supplies. Each **£319·00** *bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

CB-115	**Stand-by spares kit, for CB-110,** comprising one matched pair thermistor elements CB-142, one each electronic valve types 6AM6 and 2D21, three each cartridge fuses 1A, 5A and 10A for 200/250V models (2A, 5A and 15A for 110/130V models) two indicator lamps 14V, two illuminator lamps 6·3V and two gaskets for water pump.	Kit	£7·25	*b*
	When ordering please state voltage.			
CB-141	**Thermistor assemblies,** matched pair.	Pair	£16·50	*b*
CB-142	**Thermistor elements,** matched pair.	Pair	£4·00	*b*

When ordering replacement parts, please state serial number of calorimeter and supply voltage.

CB-200

CB-220

CB-215

CB-200

BOMB, *Gallenkamp,* to specification, with works certificate of test ... ... Each **£81·00** *b*

REPLACEMENT PARTS

CB-203	**Stand-by spares kit, for CB-200,** comprising twenty toroidal sealing rings CB-204; 2 packs of high pressure Schrader valve cores CB-206; one valve housing CB-207; one pair of electrodes with ring support for crucibles of up to 25 mm diameter, sealing ring and set of insulators CB-208; 1 pack toroidal sealing rings CB-226; 1 pack end ferrules CB-231 and 6 metres of nylon tubing CB-232 for tube assemblies	Kit	**£17·00**	*b*
CB-204	**Toroidal sealing ring.** Ten **£1·45**	Each	**£0·21**	*b*
CB-206	**Valve cores, Schrader high pressure type,** supplied in packs containing five	Pack	**£0·70**	*b*
CB-207	**Valve housing**	Each	**£1·30**	*b*
CB-208	**Electrodes,** with ring support for crucibles of up to 25 mm dia., sealing ring and set of insulators.	Set	**£9·50**	*b*

ACCESSORY

CB-212	**Pressure release valve,** with side arm for connecting to absorption apparatus. For use when determining nitrogen and sulphur corrections. Pressure in bomb may be released immediately after test thereby saving the usual waiting period for the acid mist to settle.	Each	**£5·20**	*b*

CB-215

STAND, light alloy, for supporting bomb cap when fitting crucible and firing wire ... ... Each **£3·90** *b*

CB-220

PRESSURE GAUGE, calibrated 0-50 atm with a red line at 25, a non-splintering transparent front and two blow-out holes in the rear ... ... Each **£11·00** *b*

CB-225

TUBE ASSEMBLY, nylon, 90 cm long, for connecting bomb to pressure gauge CB-220... ... Each **£2·20** *b*

REPLACEMENT PARTS

CB-226	**Toroidal sealing ring**	Pack of 10	£0·60	*m*
CB-231	**End ferrule,** for nylon tubing	For prices see entries in List No. sequence.		
CB-232	**Nylon tubing**			

CB-230

TUBE ASSEMBLY, nylon, 90 cm long, for connecting pressure gauge CB-220 to needle valve CB-235. Each **£1·50** *b*

REPLACEMENT PARTS

CB-231	**End ferrule,** for nylon tubing ...	Pack of Ten	£0·35	c
CB-232	**Nylon tubing**	Metre	£0·15	c

ACCESSORY

CB-234	**Spanner,** $\frac{3}{16}$ BSW for CB-225 and CB-230 and union nuts.	Each	£0·25	*m*

CB-235

NEEDLE VALVE, for oxygen cylinder, with 37·5 atm blow-off valve, bull nosed inlet to BS 341 and union to accept CB-230 ... ... Each **£7·25** c

Items on this page normally available from stock except those coded *N.*

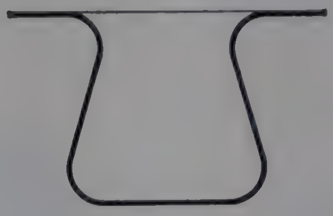
Gallenkamp AUTOBOMB

(continued)

ACCESSORIES

BOMB CRUCIBLES

		Ten	Each	
		£	£	
CB-260	**Nickel chromium,** 25 mm dia. × 18 mm deep, with flange, for testing coal to BS 1016 Pt. 5.	5·60	0·62	*c*
CB-262	As CB-260 but **transparent silica.**	—	1·20	*m*
CB-276	**Inconel Type 1,** base 19 mm dia., top 12·7 mm dia. × 19 mm deep, with flange, for standardisation with benzoic acid and testing fuels with flash points below 100°F to IP 12.	20·50	2·30	*b*
CB-278	**Inconel, Type 2,** 19 mm dia. × 19 mm deep with flange, for testing fuels with flash points above 100°F to IP 12.	7·80	0·88	*b*



CB-276

CB-278

CB-280
FIRING WIRE, platinum, 44 swg (approx. 0·08 mm dia.) ... ... Reel approx. 4·5 metres **£2·45** *m*

CB-282
FIRING WIRE, nickel chromium, 36 swg (approx. 0·19 mm dia.) ... Reel approx. 23 metres **£0·30** *c*

CB-312
REMOTE FIRING SWITCH ASSEMBLY, comprising a biased-off switch mounted in a control box suitable for fixing to bench or wall and fitted with 9 metres of twin core cable ... ... Each **£5·70** *b*

CB-320
CAPSULE, gelatine, of stated calorific value, for burning highly volatile liquids. In pack of 10.
10 packs **£1·30** Pack **£0·20** *c*

CB-325
BENZOIC ACID, Thermochemical Standard. In sealed tube containing 100 g ... ... Tube **£2·00** *m*

CB-330
FIRING COTTON, 13/14s scoured and bleached, 5–6 mg/cm in balls of about 110 g ... ... Each **£0·35** *c*

CB-340
BRIQUETTE PRESS, for solid fuels, with hardened steel punch and die 12·5 mm dia. The press has a screw action and is intended to be bolted to a bench top.
Each **£13·00** *b*

CB-351
REPORT SHEETS, for recording observations during calorific value determinations with adiabatic calorimeter, in pads of 100 sheets ... ... Each **£0·75** *c*

CB-353
INSTRUCTIONS MANUAL, for Autobomb CB-100, extra copies ... ... Each **£0·60** *b*

THERMOMETERS

TJ-564 et seq.
THERMOMETERS, calorimeter, to BS 791 ... ...

TJ-070
THERMOMETER, for water jacket, range −5 to + 50°C ... ...

For prices see entries in List No. sequence.

OTHER ACCESSORIES

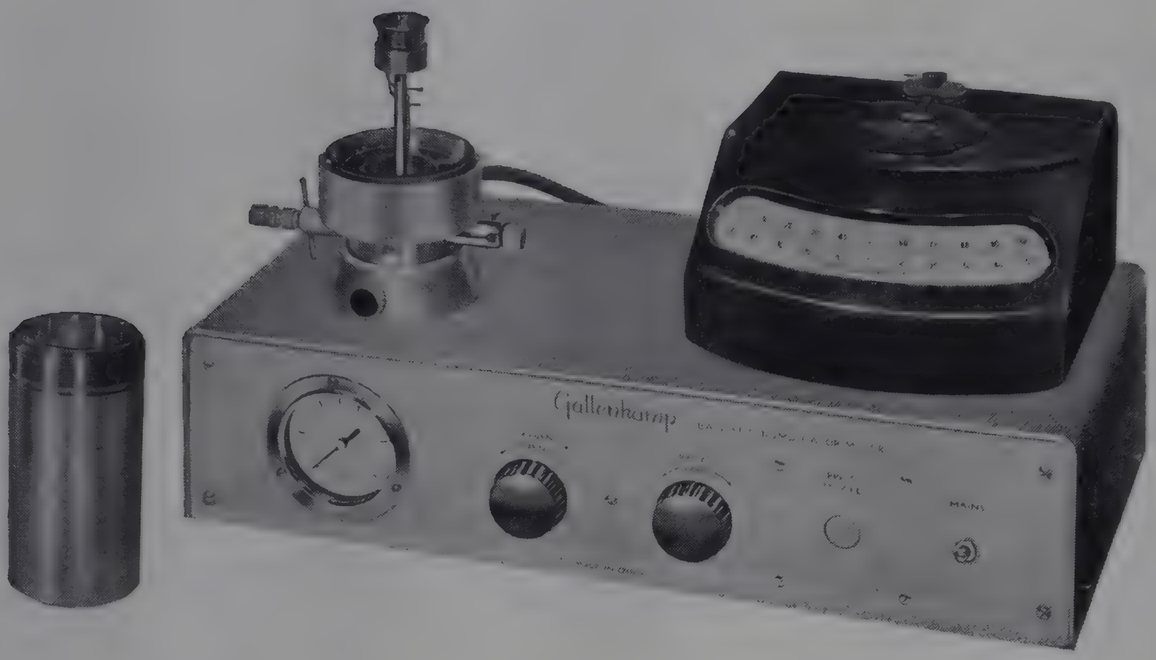
A BALANCE is required to determine the weight of water in the calorimeter vessel, capable of weighing a load of about 3 kg to an accuracy of at least 1 g. BA-850 or BC-160 with BC-165 are available.

FLEXIBLE TUBING is required for cooling water and overflow connections at the rear of the calorimeter console. Three pieces are required of length necessary to reach the nearest sink. TX-772 size N 6·5 or TX-520 size N 6·5 are suitable alternatives.

All items on this page normally available from stock.

Gallenkamp BALLISTIC BOMB CALORIMETER

for the rapid determination of calorific values of foodstuffs and faeces in dietetic research and other applications.



- **10 results per hour**
- **No special skill required**
- **Accuracy 1%**
- **Hand sealing bomb, no tools for assembly**

OPERATION

In ascertaining the calorific value of foodstuffs and other non-homogeneous materials, it is frequently difficult to obtain a truly representative single sample. In such cases the average of a number of approximate results can be superior to a single, accurate result from one sample.

The object of the Ballistic Bomb Calorimeter is to enable this to be done with speed. The heat of combustion causes a rapid rise in temperature of the bomb, shown as a 'throw' on the galvanometer spot. It is assumed, as in other ballistic instruments, that the peak galvanometer reading occurs before there is any significant heat loss from the bomb and its contents.

Having established the 'constant correction' (see Bomb firing system below) for the heat dissipated by the firing wire and cotton, the operator has merely to place the sample in the crucible, attach the cotton wicking, screw on the bomb body, fill the bomb with oxygen, press the timed firing button and read the maximum galvanometer deflection. The whole operation takes only a few minutes and calculation of calorific value to 1% accuracy is by simple proportion comparison with a benzoic acid standard.

Developed in collaboration with D. S. Miller and P. R. Payne at the Human Nutrition Research Unit of the M.R.C.

REFERENCES

(1) Laboratory Practice, 8, 119 (1959).
(2) *News and Review* No. 2, December 1960.
(3) Fox, Miller and Payne, Proc. Nutr. Soc. 18 ix (1959)
(4) Miller and Payne, Brit. J. Nutr. 12, 501 (1959).

DESIGN

Bomb

The body and base are machined from forged stainless steel bar to BS 1506–845 Grade B, which is a stabilised austenitic steel generally recognised as being the most satisfactory for calorimeter bombs. The body is secured to the base by an aluminium bronze locking ring and the joint is sealed by a toroidal ring which provides a gas-tight seal by hand tightening only. In the base are an oxygen filling point, a gas pressure release needle valve, two sockets for the connection of the electric firing circuit, a pillar to carry the crucible and an insulated electrode. The firing wire is connected between the pillar and the electrode.

Oxygen filling system

Comprising a needle valve and a pressure gauge which has a safety glass front and a blowout back. Union fittings are provided for a nylon oxygen supply tube and a nylon bomb filling tube. A hand tightening union nut with a toroidal ring is used to seal the filling tube to the bomb.

Bomb firing system

Comprising a press button operated electric timing switch and a step down transformer. This system applies 2V to the firing wire for sufficient time to raise it to red heat and ignite the sample. The wire is not affected by the firing and can be used repeatedly. The timing switch is self resetting so that the same amount of heat is introduced each time the bomb is fired. This results in a constant correction which simplifies the test procedure and the calculation of results.

Temperature measuring system

The temperature reached by the bomb body above the crucible is indicated by a light spot galvanometer connected to a thermocouple which plugs into a shallow hole in the top of the body.

Gallenkamp BALLISTIC BOMB CALORIMETER

CB-370

BOMB CALORIMETER, BALLISTIC, *Gallenkamp*. Outfit comprising base control box with one each of the following items and full operating instructions.

CB-234	2 Spanners	CB-380	Bomb filling tube
CB-260	10 Crucibles	CB-386	Battery
CB-325	1 Tube benzoic acid	CB-388	Reducing valve
CB-330	Cotton wicking	CB-390	Tube assembly
CB-375	Ballistic bomb	CB-395	Thermocouple
CB-376	Firing wire	CB-400	Galvanometer

For 200/250V 50 Hz single phase supplies ... ... Outfit **£214·50** *b*

For 110/120V 50 or 60 Hz single phase supplies ... ... Outfit **£217·00** *bN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

CB-373

STAND-BY SPARES KIT for CB-370, comprising ten each toroidal sealing rings CB-204 and CB-226, ten end ferrules CB-231, two metres nylon tubing CB-232 and one galvanometer lamp CB-401 ... ... Kit **£3·10** *b*

CB-325
BENZOIC ACID
CB-330
FIRING COTTON
For details see entries in List No. sequence.

COMPONENTS

CB-375

BALLISTIC BOMB, *Gallenkamp*, to specification, with works certificate of test. **Without firing wire.** Each **£121·00** *b*

ACCESSORY AND REPLACEMENT

CB-376 **Firing wire,** platinum alloy ... ... Each **£5·50** *m*

CB-204 **Toroidal sealing ring.** For price see entry in List No. sequence.

CB-260

CRUCIBLE, nickel chromium. For details and price see entry in List No. sequence.

CB-380

BOMB FILLING TUBE, high pressure nylon, 28 cm long, for connecting bomb to outlet on base control box. Each **£1·60** *b*

REPLACEMENT PARTS

CB-226 **Toroidal sealing ring, for CB-380**
CB-231 **End ferrule, for nylon tubing**
CB-232 **Nylon tubing**
For prices see entries in List No. sequence.

CB-234

SPANNER, $\frac{3}{16}$ BSW, for CB-380 and CB-390 union nuts. For price see entry in List No. sequence.

CB-386

BATTERY, 1·5V, *Ever Ready* D18 ... Each **£0·10** *m*

CB-388

REDUCING VALVE, for connecting to standard oxygen cylinders to give a constant output pressure which is adjustable over the range 20 to 30 atm. The valve is fitted with a blow-off on the outlet side set to operate at 32·5 atm and a union to accept tube assembly CB-390. Each **£26·00** *b*

CB-390

TUBE ASSEMBLY, 90 cm long, high pressure nylon, for connecting reducing valve CB-388 to base control box. Each **£1·35** *b*

REPLACEMENT PARTS

CB-231 **End ferrule, for nylon tubing**
CB-232 **Nylon tubing**
For prices see entries in List No. sequence.

CB-395

THERMOCOUPLE, with plug and terminations. Each **£2·90** *b*

CB-400

GALVANOMETER, spot, nominal resistance 50 ohm.

For 200/250V 50 Hz single phase supplies. Each **£47·50** *f*

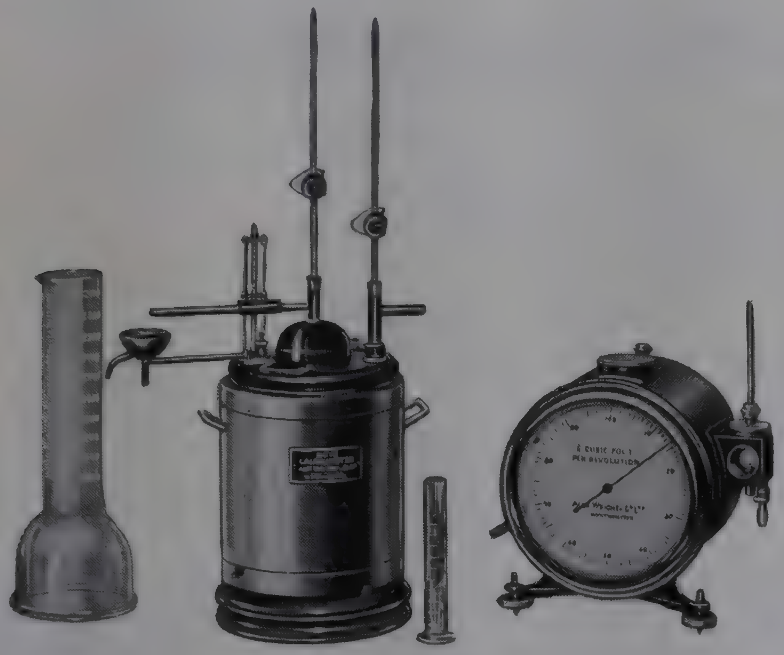
For 110/120V 50 or 60 Hz single phase supplies. Each **£50·00** *fN*

REPLACEMENT PART

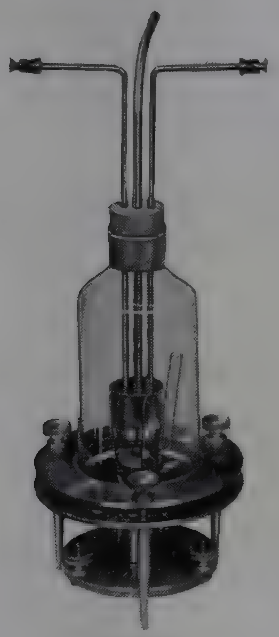
CB-401 **Lamp,** 6V, 0·5A ... ... Each **£0·13** *m*

When ordering replacement parts please state serial number of calorimeter and supply voltage.

Items on this page normally available from stock except those coded *N*.



CB-500 etc.



CB-540

CB-500

GAS CALORIMETER, Boys, non-recording, for determinations of calorific values of 'town' gases from 3550 to 5350 kcal/m³ (400 to 600 Btu/ft³). Outfit comprising components CB-502 to CB-516 listed below. Suitable for use in ambient temperatures up to 30°C.
Each **£174·00** *f*

Available for gases of higher and lower calorific values to special order. Please give full details of gas to be tested.

REPLACEMENT PARTS

CB-502	**Calorimeter vessel,** *Boys*	Each	**£93·00**	*f*
CB-504	**Coil storage vessel**	Each	**£4·00**	*f*
CB-506	**Thermometers** (2), 0 to 50°C in 0·1degC	Pair	**£5·60**	*cS*
CB-508	**Thermometers** (2), 30 to 90°F in 1degF.	Pair	**£2·50**	*cS*
CB-510	**Thermometer magnifier readers** (2).	Pair	**£7·00**	*f*
CT-224	**Cylinder,** glass, 50 cm³. For price see entry in List No. sequence.			
CB-514	**Cylinder,** glass, 2·4 litres	Each	**£4·50**	*f*
CB-516	**Gas meter, Hyde,** with fittings ...	Each	**£58·00**	*f*

ACCESSORIES

CB-518	**Gas cut-off device** for shutting off gas supply in event of water supply failure	Each	**£16·00**	*f*
CB-520	**Gas pressure governor**	Each	**£8·50**	*f*
CB 522	**Gas pressure gauge,** U-tube	Each	**£3·87**	*f*
CB-52	**Gas pressure gauge,** U-tube, for gas pressure at meter.	Each	**£3·87**	*f*
CB-526	**Gas cock,** quadrant	Each	**£10·00**	*f*

Also available for territories with high ambient temperatures. Please send details of requirements.

CB-540

CALORIMETER, Darling, for determinations of calorific values of solid, light liquid and heavy liquid fuels. Outfit comprising components CB-546 to CW-330 listed below together with liquid fuels burner, wooden case and instructions manual but **without thermometers.**
Each **£22·00** *bS*

COMPONENTS

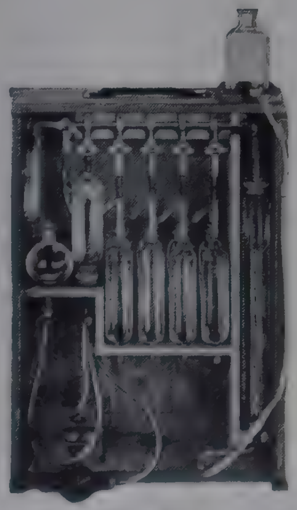
CB-546	**Outer jar,** glass	Each	**£1·10**	*cS*
CB-548	**Bell jar,** glass, with electrical connections and crucible holder	Each	**£1·40**	*cS*
CB-550	**Washers, rubber** (2)	Pair	**£0·25**	*cS*
AR-540	**Asbestos yarn,** 10 cm length	For prices see entries in List No. sequence		
CB-282	**Ignition wire,** 23 m length ...			
CW-330	**Crucible,** nickel, 25 mm ...			

ACCESSORIES

CB-552	**Thermometer,** 5 to 40°C in 0·05degC...	Each	**£3·90**	*cS*
CB-554	**Thermometer,** 40 to 105°F in 0·1degF.	Each	**£3·90**	*cS*
TJ-070	**Thermometer,** —5 to 50°C in 0·1degC. For price see entry in List No. sequence.			

Gallenkamp GAS ANALYSERS

FOR CARBON DIOXIDE ESTIMATION



GC-120

GC-020 to **GC-120**	**Orsat Gas Analysers,** approximate accuracy 1%.
GC-300 to **GC-350**	**Haldane Gas Analysers,** approximate accuracy 0·05%.
GC-400 to **GC-414**	**Lloyd Gas Analysers,** approximate accuracy 0·02%.

For details see entries in List No. sequence.

GC-400

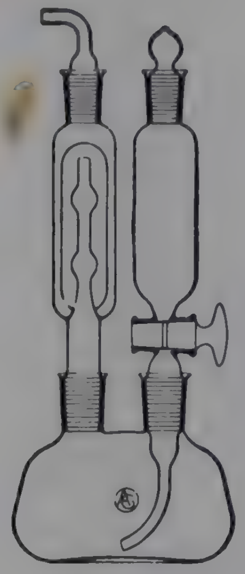
Items on this page coded *S* **normally available from stock.**

CC-630

ALKALIMETER, Schroedter, borosilicate glass, for the determination of the carbonic acid in limestone, etc. Comprises one each components CC-632 to SU-520 listed below ... ... Ten **£35·00** Each **£3·90** *a*

COMPONENTS

CC-632	**Reaction vessel** with 12/14 sockets ...	Each	£1·35	*a*
CC-634	**Absorption tube** with 12/14 cone and 10/13 socket.	Each	£0·75	*a*
CC-636	**Tap funnel** with 12/14 cone and 10/13 socket.	Each	£1·30	*a*
CC-638	**Open stopper** with 10/13 cone Ten £3·10	Each	£0·37	*a*
SU-520	**Closed stopper** with 10/13 cone. For price see entry in List No. sequence.			

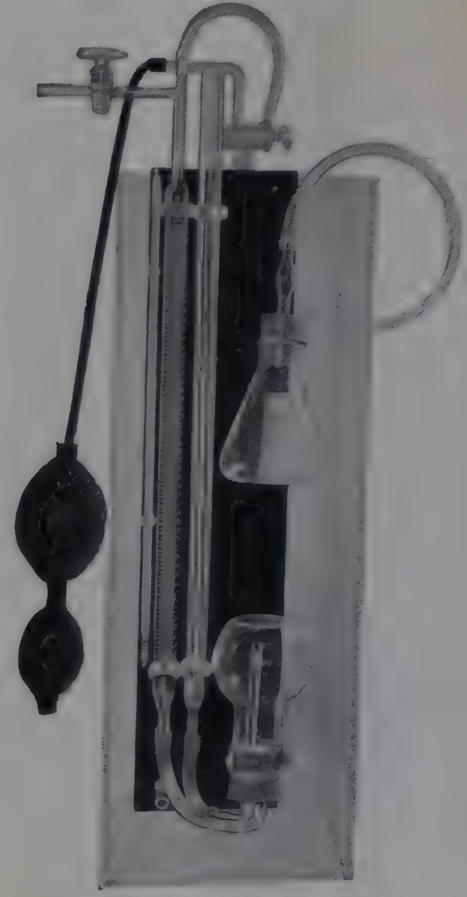

CC-630

CC-660

CALCIMETER, Collins, for the accurate determination of carbon dioxide in carbonates and carbonic acid in soils, cements, limestone, etc. Supplied with instructions manual ... ... Each **£17·85** *f*

REPLACEMENT COMPONENT AND ACCESSORY

CC-661	**Flask,** 150 ml	Each	£0·47	*m*
CC-662	**Calculating slide rule**	Each	£4·00	*m*

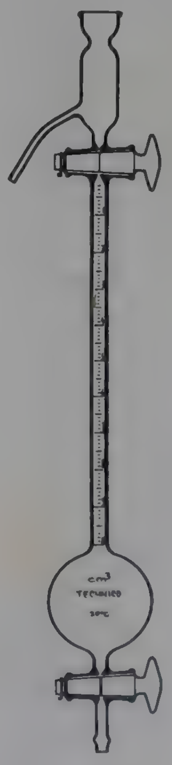

CC-660

CC-680

CARBON DIOXIDE GAS BURETTE, Martin. For the estimation of carbon dioxide in worts, beers, etc. The burette permits estimation in less than ten minutes without the need for calculations involving pressure, temperature, etc. (Reference: Journal of the Institute of Brewing, February 1936, p.79.) **Without stand or accessories** ... ... Each **£10·35** *a*

ACCESSORIES

FP-581	**Separating funnel,** 500 ml	For prices see entries in List No. sequence.
MF-920	**Levelling reservoir,** 250 ml	

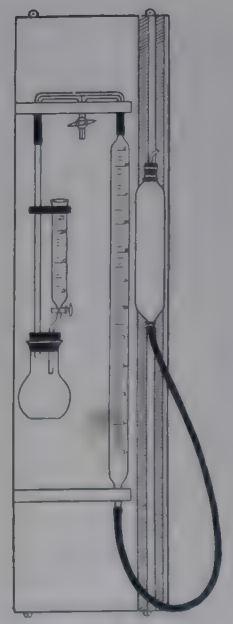

CC-680

CC-700

CHITTICK APPARATUS, for the determination of percentage carbon dioxide in baking powders and chemicals. Comprises a wall-mounting wooden board fitted with acid burette, decomposition flask, capillary manifold, gas burette and levelling reservoir. Supplied with table for correcting the volume reading for temperature and pressure to give % carbon dioxide by weight. (Reference: A.O.A.C. Official Methods of Analysis.) Each **£19·00** *b*

REPLACEMENT PARTS

CC-702	**Gas burette,** graduated —25 to +200 cm³ in 1 cm³.	Each	£1·65	*a*
CC-703	**Acid burette,** graduated 0 to 25 cm³ in 1 cm³.	Each	£1·60	*a*
CC-704	**Levelling bulb,** capacity 300 ml ...	Each	£1·20	*a*
CC-705	**Capillary manifold,** with stopcock ...	Each	£1·10	*a*
FJ-100	**Flask,** 250 ml. For price see entry in List No. sequence.			


CC-700

CARBON DIOXIDE INCUBATION

Gallenkamp manufacture continuous flow

CO_2/AIR INCUBATORS, range 0 to 45°C for use in the growth of cell, tissue and organ cultures and bacteria.

Also available

CO_2/AIR BLENDER, for the measurement and control of atmosphere supply.

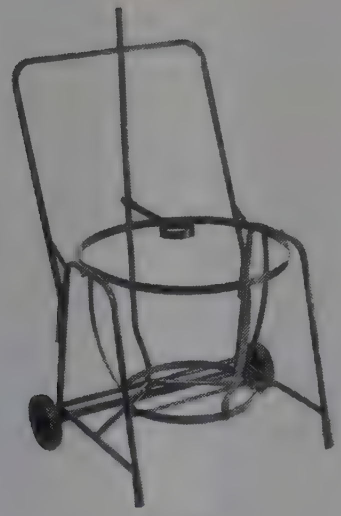
For details see IH-270 to IH-345 in List No. sequence.

All items on this page normally available from stock.

CC-932

CC-942

CC-945



CC-962

CC-965

CC-980 with BT-510

CC-932

CARBOY PUMP. Constructed entirely of plastics material except for the operating bulb which is of rubber and does not come in contact with the liquid. Suitable for use in a carboy or other container having a neck dia. not less than 39 mm and depth not more than 58 cm. Pumping rate approximately 5 litres/min. Each **£3·47** *m*

***CC-942**

CARBOY SIPHON, polythene, self priming. Comprises a flexible bulb and suction tube 36 cm long by 9 mm bore and an outlet tube 45 cm long by 9 mm bore. Flow rate approximately 4 litres/min ... ... Each **£0·35** *m*

***CC 945**

CARBOY SIPHON, polythene, self priming. Comprises a flexible bellows, suction tube 70 cm long by 10 mm bore and outlet tube 95 cm long by 10 mm bore fitted with a stopcock. A sliding tapered stopper on the suction tube fits containers with neck diameters from 35 to 64 mm. Flow rate approximately 7 litres/min. Each **£2·19** *m*

CC-962

CARBOY TIPPER, stove enamelled welded steel. A carboy may be placed in the frame and harnessed by a ring round the neck so that it can be safely tilted for emptying. With 15 cm rubber tyred wheels and trolley handle ... ... Each **£16·50** *m*

CC-965

CARBOY POURER, PVC. To fit 45 litre carboys made to BS 678 and similar with neck not exceeding 84 mm outside dia. ... ... Each **£3·10** *m*

CC-980

CARBOY/BOTTLE TROLLEY, stove enamelled welded tubular steel, with 15 cm rubber tyred wheels. Two hinged hooks are arranged to support a carboy hamper and a shaped cross bar to engage the handle of the larger sizes of bottles BT-510 ... Each **£10·50** *m*

PROTECTIVE CLOTHING

CP-705 to CP-720	**Aprons**	**CP-835 to CP-890**	**Goggles and Face Shields**
CP-795 CP-808 CP-810	**Gloves**	**CP-898 to CP-920**	**Respirators**

For details see entries in List No. sequence.

CARIUS FURNACE see FURNACES
CARIUS TUBES see TUBES
CASSEROLES see BASINS

All items on this page normally available from stock.

CD-400

CATHETOMETER, *Pye Unicam,* **for vertical working.** With telescope carriage movable along a rustless steel calibrated column.

Column range 0·05 to 1000 mm with vernier reading.

Carriage range 0·01 to 25 mm with micrometer reading.

Mounted on a tripod base fitted with levelling facilities.

Overall dimensions 33 × 33 × 137 cm high. Weight 13 kg.

Without telescope or microscope ... Each **£97·00** *fS*

CD-420

CATHETOMETER AND MEASURING MICROSCOPE, *Pye Unicam,* **for vertical and horizontal working.** With telescope carriage movable along two parallel rustless steel columns one of which is calibrated.

Column range 0·05 to 500 mm with vernier reading.

Carriage range 0·01 to 25 mm with micrometer reading.

Mounted on a calibrated rotatable platform which can be locked in any position on the heavy base. The base is fitted with levelling facilities.

Overall dimensions 25 × 25 × 80 cm high. Weight 15 kg.

Without telescope or microscope ... Each **£121·00** *f*

CD-400 with CD-430

CD-420 with CD-430

ACCESSORIES FOR CD-400 AND CD-420

CD-430 **Cathetometer telescope,** with 2·5 cm achromatic objective, focal length 15 cm, high-powered Ramsden eyepiece, glass crosswire graticule and spirit level. Focusing range from 40 cm to infinity.

Each **£32·00** *f*

CD-440 **Telescope/microscope kit** comprising one each of the following components:—

Telescope CD-430.

Reading microscope with low-powered Ramsden eyepiece with crosswire. Focusing distance approximately 4 cm. Magnification × 20.

Extension piece to extend magnification of microscope to × 36. Focusing distance approximately 3·6 cm.

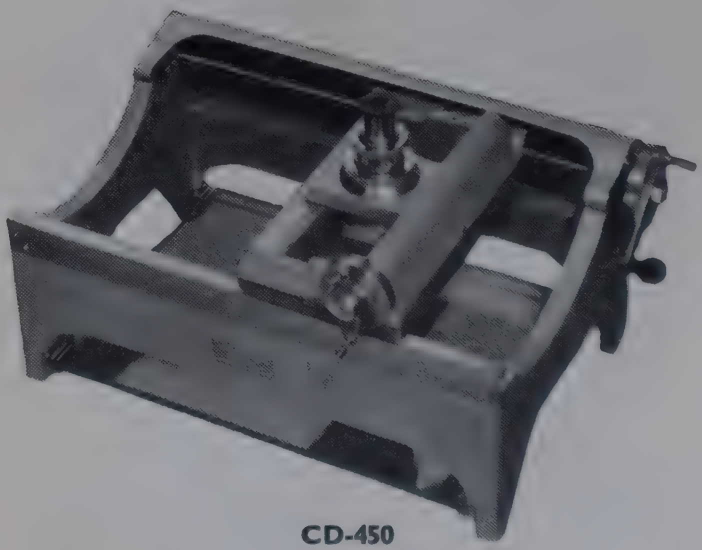
Eyepiece graticule 10 mm scale with 100 divisions. Interchangeable with crosswire in reading microscope.

Note: The barrel of the telescope is used as the mount for the microscope.

Complete in hardwood case with hinged lid.

Overall dimensions in case approximately 19 × 15 × 8 cm.

Weight approximately 1·3 kg ... ... Each **£53·00** *f*



CD-450

CD-450

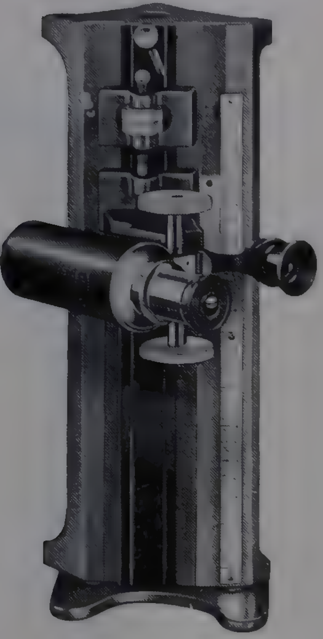
MEASURING MICROSCOPE, *Pye Unicam,* **for two dimensional horizontal working.** With lead screw adjustment giving a longitudinal movement of 200 mm and a cross traverse of 100 mm.

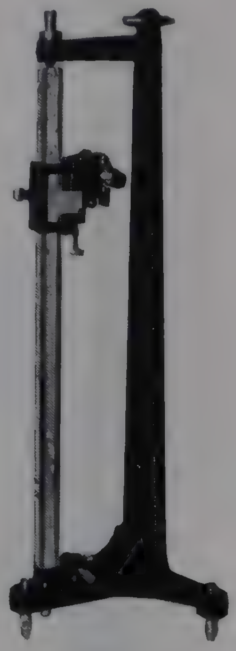
The microscope has an achromatic Ramsden eyepiece, interchangeable objectives giving × 5 and × 20 magnifications and coarse and fine focusing. A removable glass specimen plate is provided. In polished wood case.

Overall dimensions 46 × 37 × 31 cm. Weight 18 kg.

Each **£287·00** *f*

Items on this page coded *S* **normally available from stock.**


CD-480


CD-500

CD-480

MEASURING MICROSCOPE, *Vickers,* **for horizontal or vertical working.** With movable carriage and microscope which can be clamped in different positions. Carriage movement 200 mm with vernier reading to 0·02 mm.
The microscope has a ×10 crossline focusing eyepiece and ×3 objective. A removable glass stage plate is provided.
Overall dimensions 31×10×10 cm. Weight 8 kg.
Can be used as a cathetometer when fitted with accessories CD-482 and CD-484 ... Each **£59·50** *f*

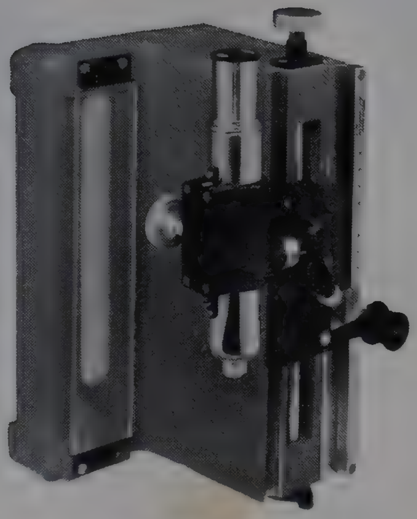
ACCESSORIES

CD-482 **Telescope objective,** to replace microscope objective when using CD-480 as a cathetometer. Each **£3·70** *f*

CD-484 **Tripod stand,** with a steel column, 90 cm high, 2 cm dia. and three levelling feet, for using CD-480 as a cathetometer ... ... Each **£10·90** *f*

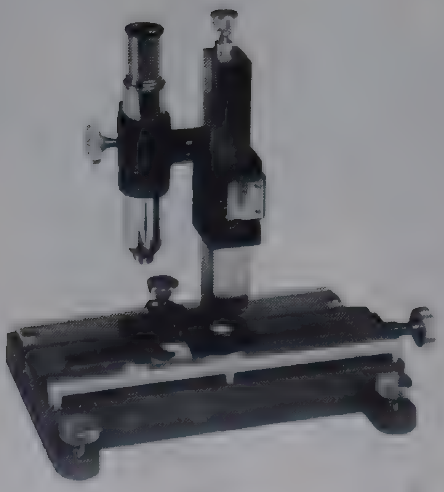
CD-500

CATHETOMETER, for horizontal or vertical working. With telescope mounted on a carriage which slides along a square brass bar.
Range 0·01 to 500 mm with vernier reading.
The telescope has a ×10 Ramsden eyepiece with crosswire and auxiliary lens, 2·5 cm objective and rack and pinion focusing from 40 cm to infinity. Mounted on a heavy tripod base.
Overall dimensions 95×59×59 cm. Weight 19 kg.
Each **£66·00** *f*


CD-520

CD-520

MEASURING MICROSCOPE, for horizontal or vertical working. With sliding carriage and microscope which can be mounted with its axis in any one of three directions with respect to travel.
Range 0·01 to 165 mm with vernier reading.
The carriage can be locked and fine adjustment of movement is provided. The microscope has a ×7 Ramsden eyepiece with crossline graticule, 5 cm working distance objective giving ×20 magnification and rack and pinion focusing. A removable glass stage plate is mounted in the base. In hardwood case.
Overall dimensions 35×19×22 cm. Weight 10 kg.
Each **£47·00** *f*


CD-530

CD-530

MEASURING MICROSCOPE, with horizontal and vertical scales.
Horizontal range 0·01 to 165 mm with vernier reading.
Vertical range 0·01 to 120 mm with vernier reading.
Comprising base, horizontal carriage with magnifier and vertical carriage with microscope. Both carriages can be locked and fine adjustment of movement is provided.
The microscope has a ×7 Ramsden eyepiece, with crosswire graticule, 5 cm working distance objective giving a ×20 magnification and rack and pinion focusing. A removable glass stage plate is mounted in the base. In hardwood case.
Overall dimensions 34×25×23 cm. Weight 10 kg.
Each **£63·80** *f*

ACCESSORIES FOR CD-520 AND CD-530

CD-535 **Telescope objective,** to increase the working distance to approximately 20 cm. Interchangeable with microscope objective ... ... Each **£2·90** *f*

CD-540 **Illumination base,** comprising 23 cm fluorescent tube mounted in an aluminium case. The top of the case is designed to locate the vernier microscopes CD-520 and CD-530 and provide full illumination of the stage plates. For 230V 50 Hz supplies ... ... Each **£19·50** *f*

All items on this page normally available from stock.

CENTRIFUGES

SECTION INDEX

		PAGE
Hand drive, for school and field use	CF-101	113
Semi-micro, to replace filtration in semi-micro scale work	*Gallenkamp* CF-200	113
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General purpose, capacity up to 400/500 ml	*Gallenkamp* CF-600	116
General purpose, capacity up to 600 ml	*International* CH-020	118
High speed, for difficult separations	*International* CH-225	119
Refrigerated, for biochemical and industrial research	*International* CH-210, CH-222, CH-225	118/119
Refrigerated vacuum ultracentrifuge	*International* CH-260	119
Tubes, bottles and accessories		120

Special purpose centrifuges will be found under the following title heading: DAIRY PRODUCTS, MEDICAL, PETROLEUM.

HAND CENTRIFUGE

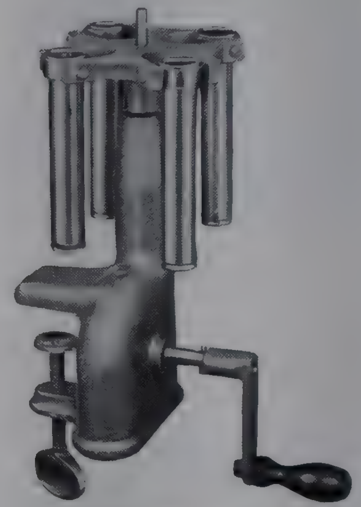
CF-101

CENTRIFUGE, hand drive. A robust cast housing, with integral bench clamp, fully encloses a machine cut gear train which enables the centrifuge to be turned at high speed with the minimum of effort. Includes removable handle but **without head or glassware.**

Each **£5·30** *m*

ACCESSORY

CF-108	**Swing-out head, 15 ml,** supplied with four buckets for tubes up to 15 ml capacity ... ... Each	**£3·60** *m*



CF-101 with CF-108

Gallenkamp

SEMI-MICRO CENTRIFUGE

A low priced machine used in schools and colleges for small scale solid-liquid separations in place of the slower and more cumbersome method of filtration.

The centrifuge bowl and base are combined in a single light alloy diecasting with a hinged cover and are finished in grey duotone enamel.

The swing-out head, which has two buckets, will swing two standard 75 × 10 mm dia. test tubes at a speed of approximately 2000 rev/min. It is driven by an induction motor which is controlled by a biased-off switch on the base to prevent the motor from being left running unattended.

Overall dimensions 28 cm dia. × 23 cm high

CF-200

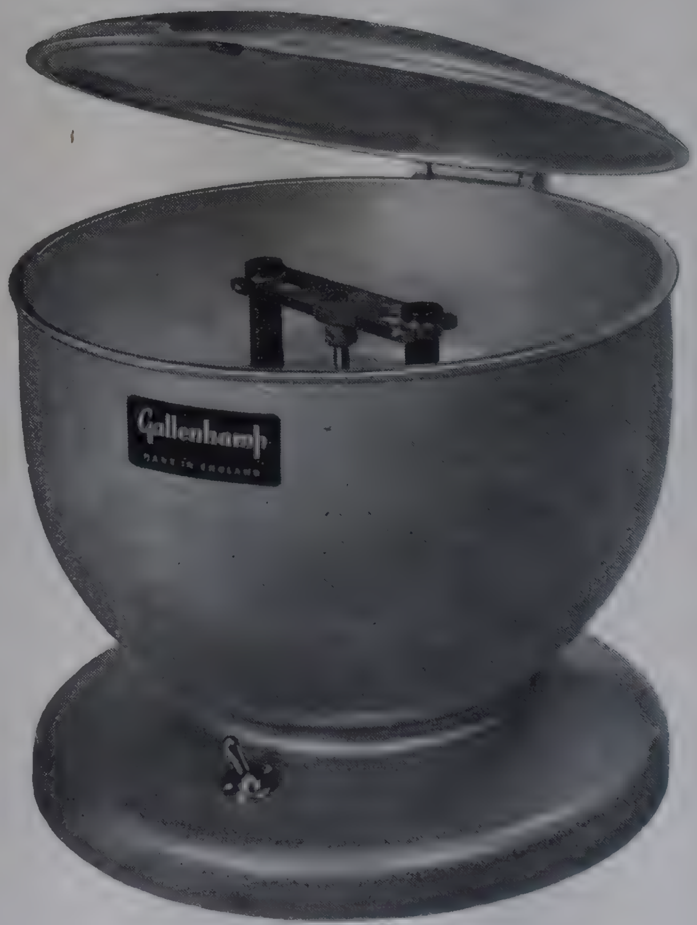
CENTRIFUGE, *Gallenkamp,* **semi-micro,** as above specification. Supplied with two buckets. **Without glassware.**

For 220/240V 50 Hz single phase supplies.

Each **£12·00** *b*

ACCESSORIES

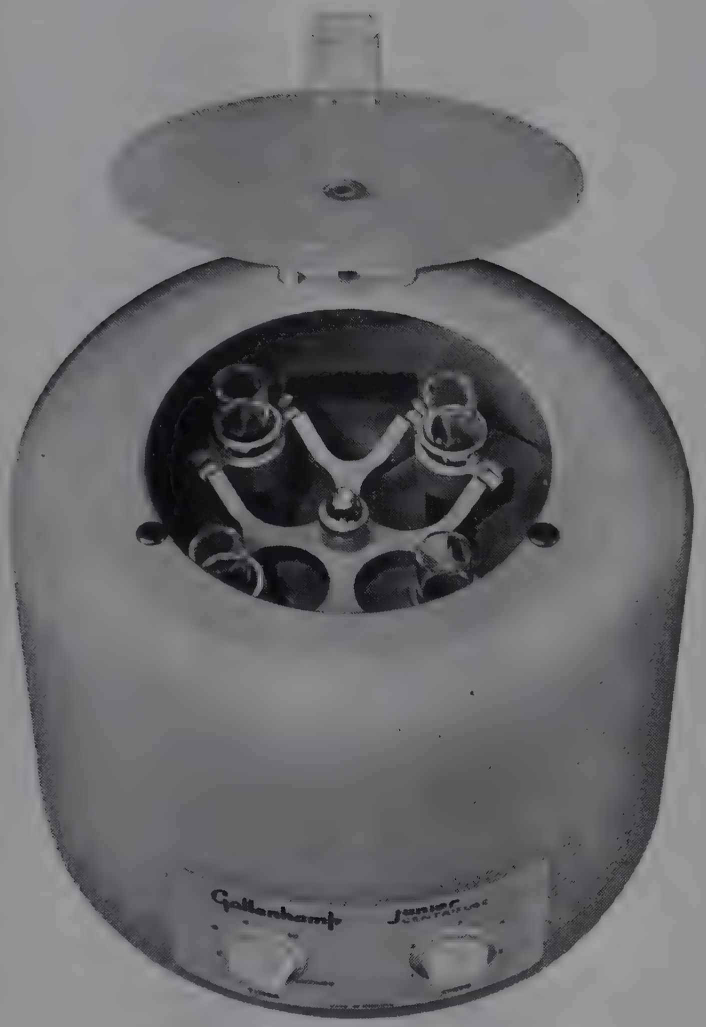
TF-180 **Test tubes,** *Pyrex brand,* 75 × 10 mm. For price see entry in List No. sequence.



CF-200

All items on this page normally available from stock.

Gallenkamp JUNIOR CENTRIFUGE



CF-405 with CF-430

The *Gallenkamp* Junior Centrifuge meets the requirements of hospitals and small industrial laboratories for a reliable, safe, yet inexpensive machine to take tubes up to 50 ml capacity.

- **Choice of angle and swing-out heads**
- **Self-balancing action**
- **Repeatable five-step speed control**
- **Maximum speed 5000 rev/min**
- **Built-in timer**

GENERAL DESIGN

The centrifuge has a robust guard bowl and cover, which completely enclose the head and protect the operator from accidental contact with rotating parts, broken glassware etc. In operation a continuous stream of air is drawn through the bowl and all parts remain cool, even after long periods of use. The motor and controls are housed below the bowl and, although totally enclosed for safety, they are readily accessible for the routine servicing. The interior of the bowl and all external surfaces are finished with a smooth easily cleaned stoved enamel which is resistant to abrasion and corrosion.

MOTOR

The motor is supported on very flexible rubber mountings. This enables the axis of rotation of the motor to change as required to compensate for out-of-balance loads without communicating this movement to the housing.

Critical balancing of the tubes is, therefore, unnecessary and the centrifuge will run quietly in conditions which would be completely impracticable with a rigid motor mounting. Television interference suppression is fitted.

CONTROLS

The speed control switch, which has an 'OFF' and five speed positions, allows accurate repetition of operating speed. The speeds are chosen so that the change in centrifugal force is approximately the same from one step to the next.

The timer can be set to give automatic control of running time up to 20 min; it can also be set for continuous running. Tachometer CF-480, which is specially designed for use with this centrifuge, can be inserted through an aperture in the cover.

HEADS

A choice of swing-out and angle heads is available. They are located on the tapered motor shaft and are held in place by a milled nut. All the heads are accurately balanced and designed for smooth running at maximum speed. The versatility of the heads is increased by a 2-place carrier and by adapters which can be used in the buckets to accommodate tubes for micro work, Wintrobe tests, etc.

Capacities, speeds and RCF values for the various heads are listed opposite.

DIMENSIONS: 30 cm high × 35 cm diameter.
WEIGHT: 10 kg.

Gallenkamp JUNIOR CENTRIFUGE

CF-405

CENTRIFUGE, *Gallenkamp* **Junior,** as specification, with self-balancing drive, built-in speed control and timer but **without heads or accessories.** For single phase supplies.

For 220/240V 50 Hz	Each	**£42·00**	*b*
For 200/210V 50 Hz	Each	**£42·50**	*bN*
For 110/120V 50 or 60 Hz	Each	**£42·50**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

CF-407	**Carbon brushes, for motor ... ...**	**Pair**	**£0·40**	*b*

When ordering replacement parts please state serial number of centrifuge and supply voltage.

CF-420

CF-430

ACCESSORIES

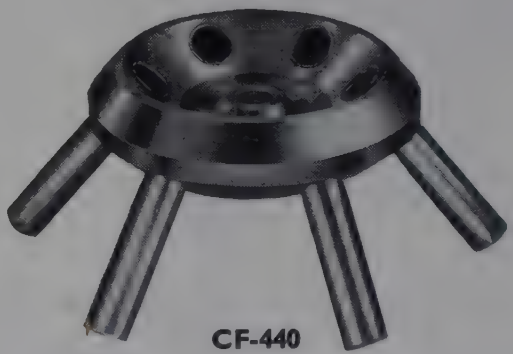
CF-420

SWING-OUT HEAD, 6-place, with 15 ml buckets. Supplied with six stainless steel buckets CF-452 and six rubber cushions CJ-305. **Without tubes.** Each **£22·00** *b*

CF-430

SWING-OUT HEAD, 4-place, with 50 ml buckets. Supplied with four detachable trunnion rings, four 50 ml brass buckets CF-454 and four rubber cushions CJ-320. **Without tubes** ... ... Each **£19·00** *b*

CF-435 **Trunnion carrier, 2 place, 15 ml, for head CF-430 in place of trunnion rings. Supplied in balanced pair with four buckets CF-452 and four cushions CJ-305.** Pair **£7·25** *b*

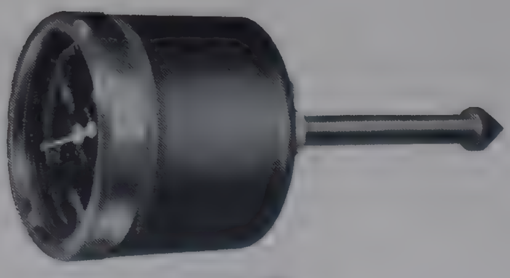

CF-440

CF-440

ANGLE HEAD, 6-place, with 15 ml buckets. Supplied with six stainless steel buckets CF-452 and six rubber cushions CJ-305. **Without tubes** ... Each **£14·00** *b*

REPLACEMENT PARTS

CF-452	**Buckets,** stainless steel 15 ml. **Without cushion CJ-305.**	Pair	**£3·10**	*b*
CF-454	**Buckets,** brass, 50 ml. **Without cushion CJ-320.**	Pair	**£4·50**	*b*


CF-480

HEAD SPEEDS AND RCF VALUES

LIST No.	TYPE	LOAD No. × ml	MAX. SPEED rev/min	MAX. RCF × g
CF-420	swingout	6 × 15	3,000	1,500
CF-430	,,	4 × 50	3,000	1,500
CF-430 **CF-435**	,,	8 × 15	3,000	1,500
CF-440	angle	6 × 15	5,000	2,750

CF-480

TACHOMETER, hand type, 13 cm long scale calibrated 0 to 5000 rev/min in white on a black dial. Complete with spindle ... ... Each **£7·25** *c*

FITTING CHART for tubes and buckets see page 120.

Items on this page normally available from stock except those coded *N.*

Gallenkamp UNIVERSAL CENTRIFUGE

CF-600

A general purpose laboratory centrifuge for a wide range of routine and research applications in all types of laboratories.

- **Maximum speed 5000 rev/min**
- **Solid state speed control**
- **Choice of angle and swing-out heads**
- **Efficient air cooling**
- **Integral speed indicator**
- **Simple routine maintenance**

GENERAL DESIGN

The centrifuge guard bowl is an annealed iron casting fitted with a hinged cast cover which closes on to rubber buffers and is held shut by a strong catch. The interior is finished with smooth stoved enamel, easy to clean, resistant to abrasion and providing good protection of the bowl from corrosion due to spilt samples.

In operation, a stream of air is drawn through the bowl by the action of the head and even after prolonged running of the largest head at maximum speed, a temperature rise of only about 10degC above ambient is experienced.

The heavy duty motor is fully enclosed and the lower section is readily accessible for routine lubrication of the lower bearing and inspection of the motor brushes.

The centrifuge is supplied with a built-in solid state speed controller which is stabilised to minimise speed variations due to mains voltage and load. A speed indicator calibrated 0 to 5000 rev/min is fitted.

HEAD SPEEDS

Four swing-out and two angle heads are available for use with the centrifuge. The capacities, speeds and RCF values of these heads are listed opposite. A full range of adapters is available to increase the versatility of the heads. The heads are fully interchangeable and balanced during manufacture.

DIMENSIONS: 57 cm high × 45 cm maximum diameter.

WEIGHT: 64 kg net.

CF-600

CENTRIFUGE, *Gallenkamp*, **Universal,** as specification, with built-in speed control, but **without heads or accessories.**

For 220/240V 50 Hz single phase supplies.	Each **£208·00**	*b*
For 200/210V 50 Hz single phase supplies.	Each **£210·00**	*bN*
For 110/120V 50 or 60 Hz single phase supplies.	Each **£210·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

CF-620	Carbon brushes, for motor	Pair	**£1·05**	*b*

When ordering replacement parts please state serial number of centrifuge and supply voltage.

HEAD SPEEDS AND RCF VALUES

LIST No.	TYPE	LOAD No. × ml	MAX. SPEED rev/min	MAX. RCF × g
CF-630	swing-out	8 × 15	4,000	2,850
CF-640	,,	4 × 50	4,000	2,800
CF-645	,,	4 × 100	4,000	3,400
CF-650	,,	4 × 250	3,000	1,800
CF-655	angle	16 × 15	5,000	3,400
CF-660	,,	8 × 50	4,000	2,150

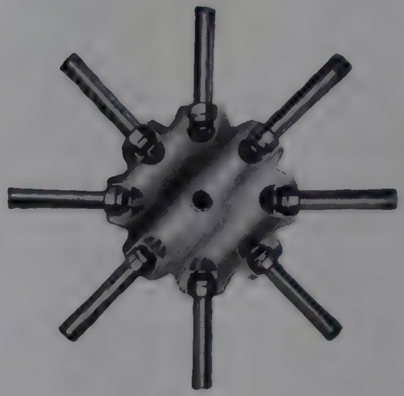
Items on this page normally available from stock except those coded ***N*****.**

Gallenkamp UNIVERSAL CENTRIFUGE

ACCESSORIES

CF-630

SWING-OUT HEAD, 8-place, with 15 ml buckets. Supplied with eight stainless steel buckets CF-672 and eight rubber cushions CJ-310. **Without tubes.** Each **£33·00** *b*



CF-630

CF-640

SWING-OUT HEAD, 4-place, with 50 ml buckets. Supplied with four brass buckets CF-674 and four rubber cushions CJ-320. **Without tubes** ... Each **£30·00** *b*

CF-645

SWING-OUT HEAD, 4-place, with 100 ml buckets. Supplied with four brass buckets CF-678 and four rubber cushions CJ-340. **Without tubes** ... Each **£35·00** *b*

CF-650

CF-650

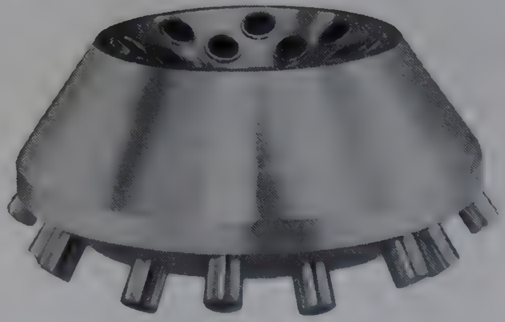
SWING-OUT HEAD, 4-place, with 250 ml buckets. Supplied with four plated steel buckets CF-680 and four rubber cushions CJ-350. **Without bottles.** Each **£90·00** *b*

CF-655

ANGLE HEAD, 16-place, with 15 ml buckets. Supplied with sixteen 15 ml stainless steel buckets CF-672 with rubber cushions CJ-310. **Without tubes.** Each **£42·00** *b*

CF-660

ANGLE HEAD, 8-place, with 50 ml buckets. Supplied with eight 50 ml steel buckets CF-676 with rubber cushions CJ-320. **Without tubes** ... Each **£45·00** *b*



CF-655

REPLACEMENT PARTS

CF-672	**Buckets,** stainless steel, 15 ml. **Without cushion CJ-310**	Pair	**£3·20**	*b*
CF-674	**Buckets,** brass, 50 ml. **Without cushion CJ-320.**	Pair	**£4·50**	*b*
CF-676	**Buckets,** steel, 50 ml. **Without cushion CJ-320.**	Pair	**£3·20**	*b*
CF-678	**Buckets,** brass, 100 ml. **Without cushion CJ-340.**	Pair	**£7·50**	*b*
CF-680	**Buckets,** steel, 250 ml. **Without cushion CJ-350.**	Pair	**£6·75**	*b*

FITTINGS CHART for tubes and buckets see page 120.

All items on this page normally available from stock.

INTERNATIONAL CENTRIFUGES

CH-020

CH-210

CH-222

We are the sole distributors in Great Britain, Northern Ireland, Eire and Commonwealth Territories for the International Equipment Company, Massachusets, U.S.A.

Importation of I.E.C. Centrifuges. At the time of going to press, all International centrifuges intended for use in the U.K. are liable to import duty. In certain cases, purchasers may apply for remission of duty and our Sales Department will be pleased to assist and advise on this matter.

*CH-020

CENTRIFUGE, *International*, **MODEL HN-S.** A multi-application, versatile, general purpose centrifuge for angle and swing-out heads and which also accepts oil, Babcock and micro-haemocrit heads. With solid state speed control, 2 to 60 minute timer and electrical braking facilities.

Maximum capacity	600 ml
RCF maximum	2550 g
Weight	22 kg
Dimensions	50 cm dia. × 45 cm height
Electrical supply	230V, 50 Hz, 125W

Price from **£200·00** *f*

*CH-210

CENTRIFUGE, *International*, **MODEL PR-J.** A general purpose refrigerated centrifuge for angle and swing-out heads. With solid state speed control, 2 to 120 minute timer and electrical braking facilities.

Minimum temperature	−20°C
Maximum capacity	4000 ml
RCF maximum	4240 g
Weight	181 kg
Dimensions	74 × 61 × 89 cm
Electrical supply	230V, 50 Hz, 1·2 kW

Price from **£1130·00** *f*

*CH-222

CENTRIFUGE, *International*, **MODEL PR-6.** A general purpose and blood bank refrigerated centrifuge for angle and swing-out heads, zonal rotors and blood bags. With solid state speed control, 0 to 15 and 0 to 120 minute timers and electrical braking facilities.

Minimum temperature	−30°C
Maximum capacity	4000 ml
RCF maximum	7900 g
Weight	272 kg
Dimensions	86 × 81 × 94 cm
Electrical supply	230V, 50 Hz, 1·3 kW

Price from **£1380·00** *f*

Detailed quotations on the above centrifuges and accessories will be sent on request.

INTERNATIONAL CENTRIFUGES

***CH-225**

CENTRIFUGE, *International,* **MODEL B-20.** A high speed refrigerated centrifuge to fill the gap between routine and ultracentrifuges. Applications include fractionation of proteins, preparation of DNA, purification of virus and separation of blood samples. For angle and swing-out heads. With saturable reactor speed control for high repeatability, 0 to 120 minute timer and electrical braking facilities.

Minimum temperature	−30°C
Maximum capacity	1500 ml
RCF maximum	46,300 g
Weight	420 kg
Dimensions	114×76×94 cm
Electricity supply	230V, 50 Hz, 4·5 kW

Price from **£1440·00** *f*

CH-225

***CH-260**

ULTRACENTRIFUGE, *International,* **MODEL B-60.** A refrigerated, high speed centrifuge with vacuum facilities for advanced biological research and density gradient work. With solid state speed control, 6 hour timer and electrical braking facilities. No derating of rotors is necessary.

Minimum temperature	−10°C
Maximum capacity	2000 ml
RCF maximum	405,000 g
Weight	613 kg
Dimensions	114×76×99 cm
Electrical supply	230V, 50 Hz, 7 kW
Cooling water supply	<23·5°C

Price from **£4680·00** *f*

Detailed quotations on the above centrifuges and accessories will be sent on request.

IEC
INTERNATIONAL CENTRIFUGE

CH-260

ZONAL CENTRIFUGATION

Zonal centrifugation can provide shorter run times, larger gradient volumes and better resolution than most currently available methods including those using fixed-angle and swinging-bucket rotors.

A zonal rotor is basically a large volume, cylindrical pressure vessel rotating on an axis. Gradient material is stabilised within the rotor by transverse septa forming sector-shaped chambers, thus minimising wall effects. The gradient material is introduced into the rotor through a multi-channel fluid seal. Rotors are filled with gradient material through the rim line and the effluents are collected from the core line.

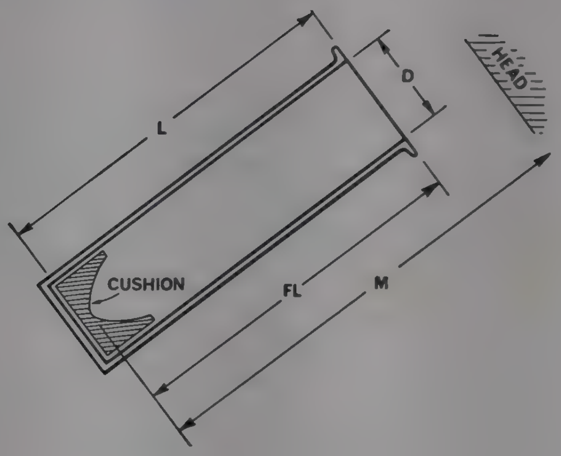
Three types of zonal rotors are offered by I.E.C. The **'A' series low** speed rotor is designed for the isolation and purification of large cellular species as well as larger subcellular organelles such as nuclei, mitochondria, and lysosomes. The **'A' series intermediate** speed rotor allows centrifugation and purification of subcellular components such as chloroplasts, mitochondria, and large viruses such as the tobacco mosaic virus.

The **'B' series** rotors are high speed rotors with a disk configuration that allows isolation of subcellular particles down to the ribosomal, ribosomal subunit, and macromolecule size. Particle studies with sedimentation coefficients to 10s such as large proteins, bacterial RNA, serum macroglobulin, and smaller viruses such as polio are ideally suited for use in these rotors.

Full details and prices of zonal rotors will be sent on request.

FITTING CHART FOR TUBES AND BUCKETS

Model	Bucket List No.	Material	Capacity (ml)	Use cushion List No.	Dimension L (mm)	Dimension FL (mm)	Dimension D (mm)	Dimension M (mm)
JUNIOR								
	CF-452	Stainless steel	15	**CJ-305**	93	82	18·0	AH
	CF-454	Brass	50	**CJ-320** **CJ-330**	95	89	30·0	118
UNIVERSAL								
	CF-672	Stainless steel	15	**CJ-310**	111	99	18·0	AH
	CF-674	Brass	50	**CJ-320**	117	110	30·0	127·0
	CF-676	Steel	50	**CJ-320**	116	109	30·0	AH
	CF-678	Brass	100	**CJ-340**	129	125	34·0	158·7
	CF-680	Steel	250	**CJ-350**	129	121	63·5	136·5



NOTE:

'AH' indicates bucket used only in angle heads.
'M' is the maximum length of tube which can be used without fouling centrifuge head.

CENTRIFUGE TUBES

All dimensions given are nominal

CAPACITIES 0·5 to 12 ml.

CJ-005

CJ-005

CENTRIFUGE TUBES, conical, borosilicate glass. To BS 1428 part E3. In packs of ten.

Capacity	0·5	1	2	3 ml	
Diameter	6·3	8·5	11·25	11·25 mm	
Height	60	63	68	76 mm	
10 packs	**£11·00**	**11·00**	**11·80**	**11·80**	*a*
Pack	**£ 1·25**	**1·25**	**1·30**	**1·30**	

CJ-012

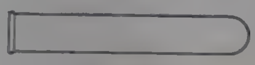
***CJ-012**

CENTRIFUGE TUBE, cylindrical, polypropylene, capacity 3 ml, overall dimensions 11 × 76 mm.
Ten **£1·50** Each **£0·22** *m*

CJ-015

CJ-015

CENTRIFUGE TUBE, conical, borosilicate glass, capacity 5 ml, overall dimensions 13·5 × 103 mm. In pack of ten ... ... 10 packs **£13·00** Pack **£1·45** *a*



CJ-035

***CJ-035**

CENTRIFUGE TUBE, cylindrical, polypropylene, capacity 12 ml, overall dimensions 16 × 100 mm.
Ten **£1·63** Each **£0·23** *m*

CJ-038

***CJ-038**

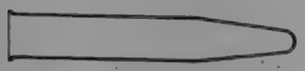
CENTRIFUGE TUBE, conical, *Corex* glass, medium speed, capacity 12 ml, overall dimensions 17 × 120 mm.
24 **£15·50** Each **£0·74** *d*

For information on *Corex* tubes see page 122.

All items on this page normally available from stock.

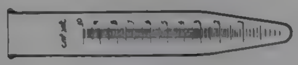
CENTRIFUGE TUBES

CAPACITY 15 ml.



CJ-040

CJ-040
CENTRIFUGE TUBE, conical, soda-lime glass, capacity 15 ml, overall dimensions 17·5 × 111 mm. In pack of ten ... 10 packs **£6·00** Pack **£0·66** *c*



CJ-042

***CJ-042**
CENTRIFUGE TUBE, conical, soda-lime glass, capacity 15 ml, graduated 10 cm^3 in 0·1 cm^3. Overall dimensions 17·5 × 111 mm. In pack of ten.
10 packs **£20·50** Pack **£2·30** *c*

CJ-043 CJ-044

† *CJ-043
CENTRIFUGE TUBE, conical, *Corex* glass, low speed, capacity 15 ml, overall dimensions 17 × 124 mm.
30 **£12·00** Each **£0·47** *d*

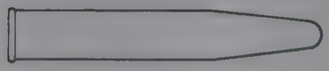
CJ-044
CENTRIFUGE TUBE, conical, borosilicate glass, capacity 15 ml, overall dimensions 17·5 × 111 mm. In pack of ten ... ... 10 packs **£10·80** Pack **£1·20** *c*

CJ-045

† *CJ-045
CENTRIFUGE TUBE, conical, *Corex* glass, low speed, capacity 15 ml, graduated 15 cm^3 in 0·1 cm^3, overall dimensions 17 × 124 mm.
18 **£24·50** Each **£1·55** *d*

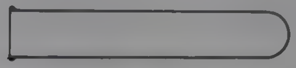
CJ-046

CJ-046
CENTRIFUGE TUBE, conical, *Pyrex brand* glass, capacity 15 ml, graduated in 0·1 cm^3 up to 3 cm^3 and 0·5 cm^3 from 3 to 10 cm^3, overall dimensions 17 × 110 mm.
48 **£13·80** Each **£0·37** *d*



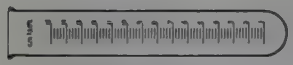
CJ-048

CJ-048
CENTRIFUGE TUBE, conical, polypropylene, capacity 15 ml, overall dimensions 17 × 111 mm. In pack of ten.
10 packs **£4·80** Pack **£0·53** *c*



CJ-050

CJ-050
CENTRIFUGE TUBE, cylindrical, soda-lime glass, capacity 15 ml, overall dimensions 17·5 × 111 mm. In pack of ten... ... 10 packs **£6·00** Pack **£0·68** *a*

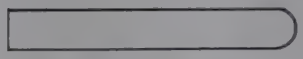


CJ-052

CJ-052
CENTRIFUGE TUBE, cylindrical, soda-lime glass, capacity 15 ml, graduated 1 to 15 cm^3 in 0·2 cm^3, overall dimensions 17·5 × 111 mm. With permanent graduations and inscriptions in amber stain.
Ten **£3·30** Each **£0·39** *a*

CJ-055

***CJ-055**
CENTRIFUGE TUBE, cylindrical, polypropylene, capacity 15 ml, overall dimensions 16 × 115 mm.
Ten **£1·87** Each **£0·26** *m*



CJ-057 CJ-060

† *CJ-057
CENTRIFUGE TUBE, cylindrical, *Corex* glass, rimless, low speed, capacity 15 ml, overall dimensions 16 × 116 mm ... 48 **£9·75** Each **£0·28** *d*

† *CJ-060
CENTRIFUGE TUBE, cylindrical, *Corex* glass, rimless, high speed, capacity 15 ml, overall dimensions 17 × 103 mm. For high speed usage must be used with adapter CJ-061 in larger bucket.
48 **£9·75** Each **£0·28** *d*

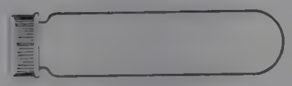
ACCESSORY
***CJ-061 Adapter,** rubber, for CJ-060. Overall dimensions 29 × 102 mm ... 12 **£7·00** Each **£0·66** *d*

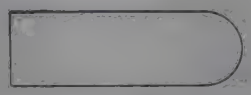
† *Corex* **tubes—see information on page 122.**

All items on this page normally available from stock.

CENTRIFUGE TUBES

CAPACITIES 20 to 45 ml.


CJ-075


CJ-076

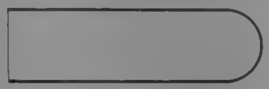
***CJ-075**

CENTRIFUGE TUBE, cylindrical, *Corex* glass, high speed, with screw cap, capacity 25 ml, overall dimensions 24 × 106 mm. For high speed usage must be used with adapter CJ-076 in a larger bucket.

12 £16·50 Each £1·55 *d*

ACCESSORY

***CJ-076** **Adapter,** rubber, for CJ-075. Overall dimensions 29 × 92 mm ... 12 £7·25 Each £0·68 *d*


CJ-082 CJ-083

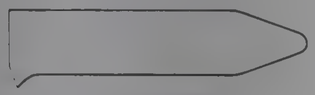
***CJ-082**

CENTRIFUGE TUBE, cylindrical, *Corex* glass, high speed, rimless, capacity 30 ml, overall dimensions 25 × 102 mm. For high speed usage must be used with adapter CJ-083 in a larger bucket.

36 £11·00 Each £0·38 *d*

ACCESSORY

***CJ-083** **Adapter,** rubber, for CJ-082. Overall dimensions 29 × 102 mm ... 12 £7·25 Each £0·68 *d*


CJ-090

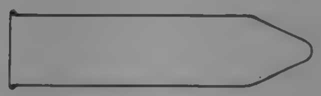
***CJ-090**

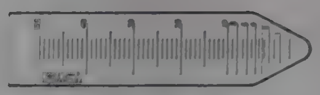
CENTRIFUGE TUBE, conical, *Corex* glass, low speed, with pouring lip, capacity 40 ml, overall dimensions 29 × 118 mm ... 12 £11·75 Each £1·10 *d*

> *COREX* **Centrifuge Tubes**
>
> These tubes are made in the U.S.A. from a special type of glass which is treated by an ion-exchange process to increase its strength and surface hardness. They withstand repeated steam sterilisation without visible clouding and may be used up to 300°C without damage. They are especially recommended for use where the safety of samples is an important consideration.
>
> Low speed tubes are suitable up to 4500 g, medium speed tubes up to 15,000 g and the high speed tubes may safely be spun up to 40,000 g.
>
> Any *Corex* centrifuge tube which becomes unserviceable in normal use within twelve months from date of purchase will be replaced free of charge.

Fittings chart for tubes and buckets—see page 120.

CAPACITY 50 ml.


CJ-100


CJ-102

CJ-100

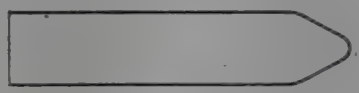
CENTRIFUGE TUBE, conical, soda-lime glass, capacity 50 ml, overall dimensions 29 × 118 mm.

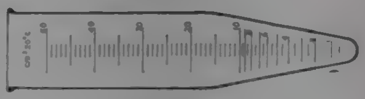
Ten £1·40 Each £0·21 *a*

CJ-102

CENTRIFUGE TUBE, conical, soda-lime glass, capacity 50 ml, graduated 50 cm³ in 1 cm³, overall dimensions 29 × 118 mm. With permanent graduations and inscriptions in amber stain.

Ten £5·60 Each £0·62 *a*


CJ-110


CJ-112

***CJ-110**

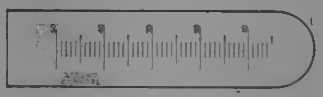
CENTRIFUGE TUBE, conical, *Corex* glass, low speed, capacity 50 ml, overall dimensions 29 × 135 mm.

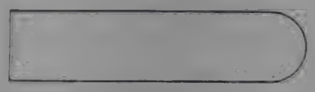
30 £20·00 Each £0·78 *d*

***CJ-112**

CENTRIFUGE TUBE, conical, *Corex* glass, low speed, capacity 50 ml, graduated in 0·5 cm³ up to 10 cm³ and 1 cm³ from 10 to 50 cm³, overall dimensions 29 × 135 mm.

12 £20·00 Each £1·90 *d*


CJ-122


CJ-124

CJ-122

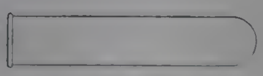
CENTRIFUGE TUBE, cylindrical, soda-lime glass, capacity 50 ml, graduated 50 cm³ in 1 cm³, overall dimensions 29 × 118 mm. With permanent graduations and inscriptions in amber stain.

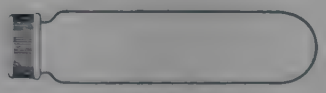
Ten £5·60 Each £0·62 *a*

CJ-124

CENTRIFUGE TUBE, cylindrical, borosilicate glass, capacity 50 ml, overall dimensions 29 × 118 mm.

Ten £1·40 Each £0·21 *a*


CJ-138


CJ-150

CJ-138

CENTRIFUGE TUBE, cylindrical, polypropylene, rimless, capacity 50 ml, overall dimensions 29 × 111 mm.

Ten £2·50 Each £0·31 *c*

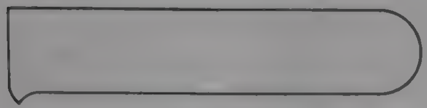
***CJ-150**

CENTRIFUGE TUBE, cylindrical, *Corex* glass, low speed, with screw cap, capacity 50 ml, overall dimensions 29 × 123 mm ... 12 £19·50 Each £1·80 *d*

All items on this page normally available from stock.

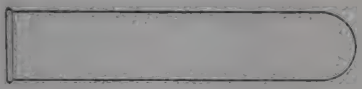
CENTRIFUGE TUBES AND BOTTLES

TUBES
CAPACITY 100 ml



CJ-160

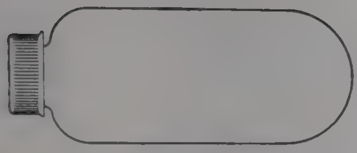
CJ-160
CENTRIFUGE TUBE, cylindrical, borosilicate glass, with lip, capacity 100 ml, overall dimensions 33×160 mm.
Ten **£2·40** Each **£0·30** *m*



CJ-172

***CJ-172**
CENTRIFUGE TUBE, cylindrical, polypropylene, capacity 100 ml, overall dimensions 32×164 mm.
Ten **£5·25** Each **£0·58** *m*

BOTTLES



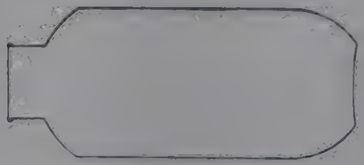
CJ-190

CJ-191

† *CJ-190
CENTRIFUGE BOTTLE, *Corex* glass, with polypropylene screw cap, medium speed, capacity 150 ml, overall dimensions 53×136 mm. Must be used with adapter CJ-191 in a larger bucket.
Six **£21·50** Each **£3·90** *d*

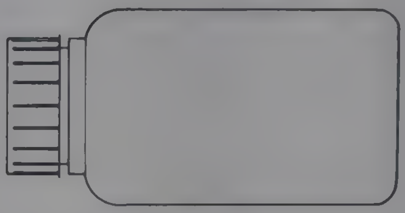
ACCESSORY
***CJ-191** **Adapter,** rubber, for CJ-190. Overall dimensions 61×122 mm ... Six **£9·60** Each **£1·75** *d*

† **See information on page 122.**



CJ-210

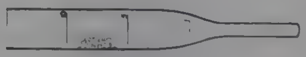
CJ-210
CENTRIFUGE BOTTLE, *Pyrex brand* glass, with neck, capacity 210 ml, overall dimensions 60×143 mm.
24 **£7·20** 12 **£3·70** *d*
Each **£0·37**



CJ-212

***CJ-212**
CENTRIFUGE BOTTLE, polypropylene, with screw cap, capacity 250 ml, overall dimensions 60×120 mm.
Each **£0·73** *m*

SPECIAL PURPOSE TUBES



CJ-220

CJ-220
CENTRIFUGE TUBE, Hopkins vaccine, graduated 0 to 0·05 in 0·01 cm³ and marks at 1, 5 and 10 cm³, overall dimensions 17·5×117·5 mm. With permanent graduations and inscriptions in amber stain.
Ten **£6·60** Each **£0·74** *a*

MC-700	**WINTROBE TUBE** to BS 4316.	For details see entries in List No. sequence.
PH-912	**WATER and SEDIMENT TUBE** to ASTM D1796-IP75	

RUBBER CUSHIONS

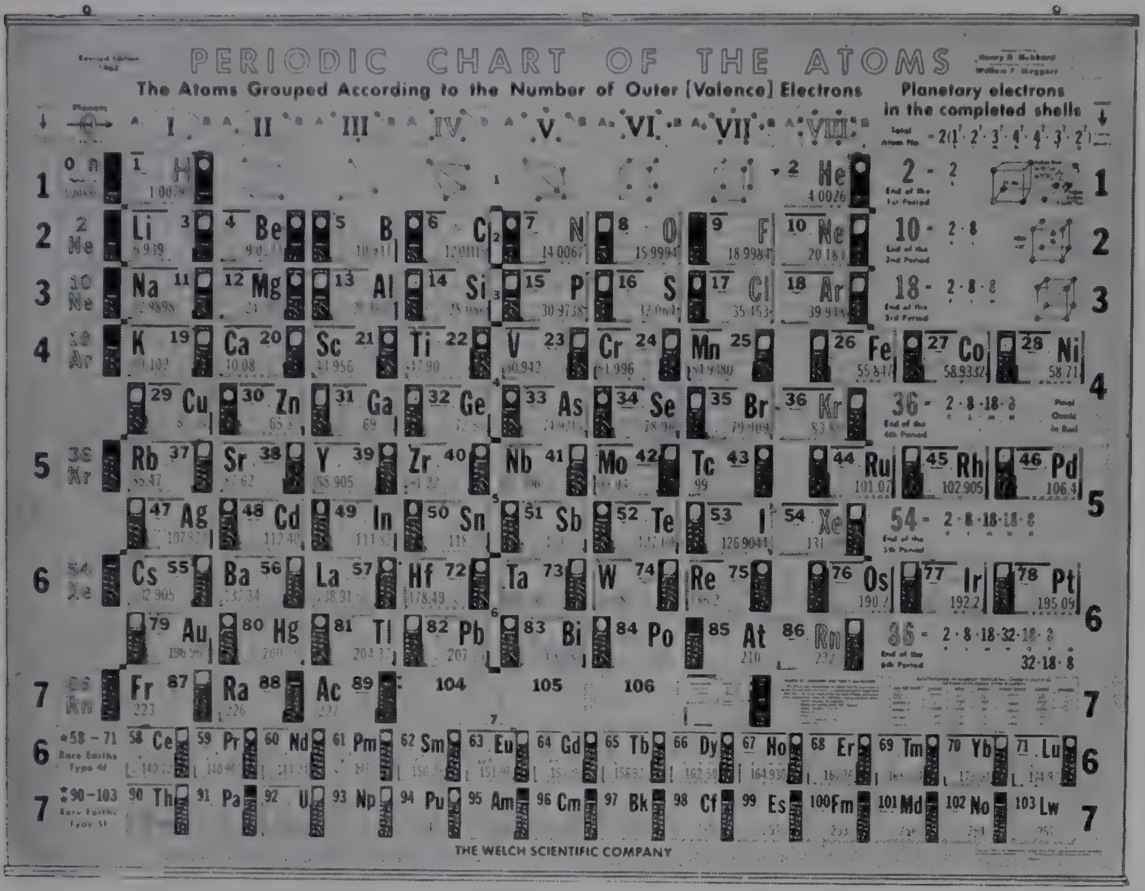
		Pack of Ten	
		£	
CJ-305	For 15 ml short buckets CF-450 and CF-452	0·50	c
CJ-310	For 15 ml long buckets CF-670 and CF-672	0·55	c
CJ-320	For 50 ml buckets when using round bottom tubes	0·80	c
CJ-330	For 50 ml buckets when using short conical tubes CJ-100 and CJ-102 only	1·10	c
CJ-335	For 50 ml bucket CF-454 when using universal container CX-230	1·25	c
CJ-340	For 100 ml buckets	0·95	c
CJ-350	For 250 ml buckets	2·25	c

EBONITE ADAPTERS

		Pair	
		£	
CJ-402	For using tubes CJ-005 and CJ-012 in 15 ml buckets. Supplied in balanced pairs	4·10	b
CJ-410	For using 5 ml tubes CJ-015 in 15 ml buckets. Supplied in balanced pairs	2·20	b
CJ-420	For using Wintrobe tube MC-700 in 15 ml buckets. Supplied in balanced pairs	2·20	b
CJ-430	For using 15 ml tubes in 50 ml buckets. Supplied in balanced pairs	3·20	b

Fitting chart for tubes and buckets—see page 120.

All items on this page normally available from stock.


PERIODIC CHART OF THE ATOMS
The Atoms Grouped According to the Number of Outer (Valence) Electrons
Planetary electrons in the completed shells
THE WELCH SCIENTIFIC COMPANY

CJ-900

CHARTS

***CJ-900**

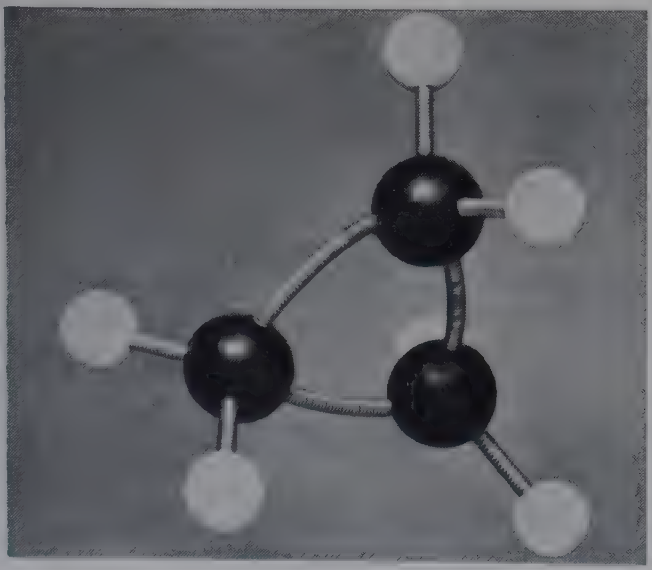
PERIODIC CHART of the ATOMS, Meggers, originally designed by H. D. Hubbard of the American National Bureau of Standards. A large multi-coloured chart, 110 × 150 cm wide, printed on heavy paper finished with matt plastics protective surface, with metal rims at top and bottom and eyelets for hanging. Clearly presents the principal facts of all known elements and their atoms; recently discovered transuranic elements are included. In each case atomic number, atomic weight and symbol are shown in large display type, and in most cases some thirty other items of information are given. The chart is supplied with a 48-page explanatory booklet containing further useful information ... Each **£8·25** c

Gallenkamp MOLECULAR MODELS

For Inorganic Chemistry · Organic Chemistry · Crystallography

- **Theoretical explanations clearly illustrated**
- **Teaching simplified; maximum student comprehension achieved**

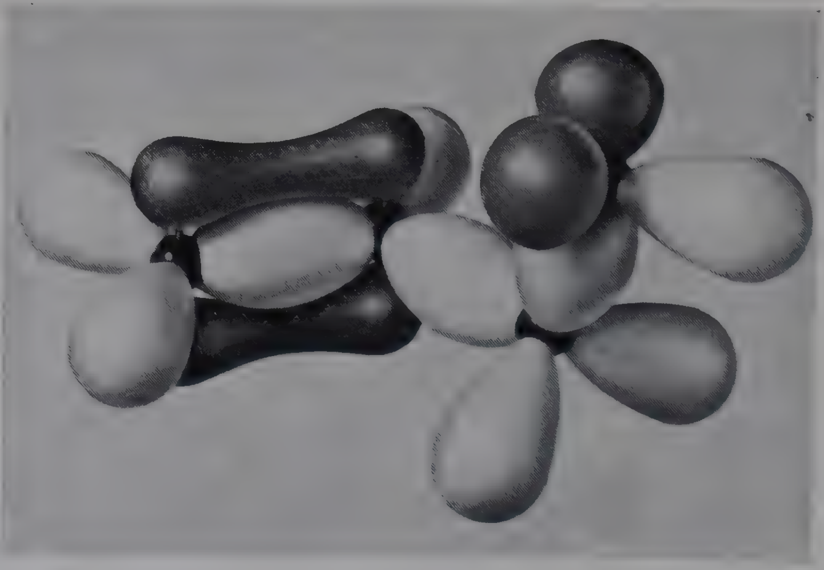
LINNELL Models



Model of cyclopropane showing:
atomic centre positions
electron band axes
molecular excitations

For details see MV-800 et seq. in List No. sequence.

PEEL Models



Model of propenol showing:
molecular orbitals
sigma and pi-bonds
steric effects

For details see MV-900 et seq. in List No. sequence.

All items on this page normally available from stock.

CHROMATOGRAPHY

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PAPER CHROMATOGRAPHY

Gallenkamp DRYING OVENS

OV-010 Hotbox Ovens

Two economically priced ovens with good ventilation and temperature control, suitable for paper and other drying. Aluminium interiors with wide shelves. Maximum operating temperature 200°C.

OV-880 Drying Cabinet

A large capacity cabinet with toughened glass doors for rapid, controlled drying of chromatography sheets up to 58 × 68 cm. Optional exhaust fan for rapid removal of moisture and vapours. Maximum operating temperature 120°C.

For detailed specifications and prices see **OVENS**

CK-180
CK-182

CK-180

CHROMATOGRAPHY TANK, glass. For ascending, descending and two-dimensional paper chromatography when solvent vapours preclude the use of metal or other corrodible materials. With recessed shoulders for the twin solvent troughs and glass support rods. Additional recesses are provided for rods over which paper sheets may be draped to accelerate equilibration. The rims and plate glass covers are ground to provide an airtight fit with greasing and the covers are drilled with two solvent filling holes. Internal dimensions 30 × 20 × 56 cm high. Includes two glass troughs with 29 cm usable length, two glass anchor rods, four anti-siphon glass rods, two drape paper rods, glass cover and twelve plastics stoppers.
Each **£26·55** *f*

CK-182

CHROMATOGRAPHY TANK, as CK-180 but internal dimensions 51 × 20 × 56 cm high and with troughs having 50 cm usable length ... ... Each **£35·60** *f*

REPLACEMENT PARTS

CK-187	**Trough, for CK-180**	Each	**£2·45**	*f*
CK-188	**Trough, for CK-182**	Each	**£3·85**	*f*

CK-280

CK-280

HOT AIR BLOWER, portable, for general drying purposes including chromatography papers. Output 300 litres/min air at 95°C. Blower incorporates a 50W universal motor and a 500W heating element with interlocking safety switches for hot or cold air. Complete with 3-core mains lead.

For 200/250V a.c. supplies	Each	**£10·60**	*m*
For 100/110V a.c. supplies	Each	**£11·10**	*fN*

CK-300

DRYING CLIPS, stainless steel, with white plastics label, for holding chromatography paper when drying. In pack of ten ... ... 10 packs **£17·00** Pack **£1·90** *c*

CK-318

ALL-GLASS SPRAY, for producing a fine even aerosol of chromatography reagents and dyes. Comprises spray head, 100 ml conical flask, rubber blowball and two spring connectors ... ... Each **£4·50** *c*

REPLACEMENT PARTS

CK-320	**Spray head, with 24/29 cone**	Each	**£2·90**	*c*
CK-322	**Flask, 100 ml, with horns**	Each	**£0·65**	*a*
JR-140	**Spring connectors, 38 mm, stainless steel**	For prices see entries in List No. sequence.		
RV-050	**Blowball, with reservoir, size No. 4**			

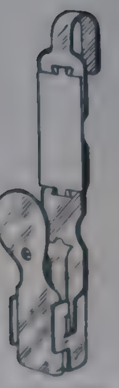
PM-546

MICROPIPETTES, Kirk pattern, capacities 5 to 100 mm³.

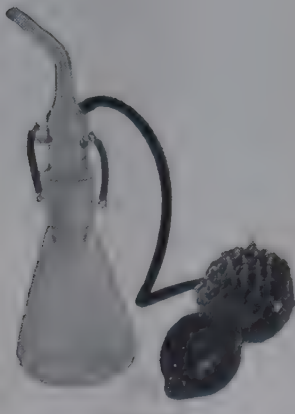
TR-120

STOPCLOCK, 60 minutes total.

For details of the above see entries in List No. sequence.



CK-300



CK-318

Items on this page normally available from stock except those coded *N*.

WHATMAN PAPERS FOR CHROMATOGRAPHY

CK-510

CHROMATOGRAPHY PAPER, Grade 1, for qualitative work in one and two dimensional separations. With a medium flow rate. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	£2·00	2·95	f

CK-515

CHROMATOGRAPHY PAPER, Grade 1, as CK-510, but supplied in 100 metre roll 5 cm wide.
Each **£0·44** f

CK-525

CHROMATOGRAPHY PAPER, Grade 3, a rough thick paper with a medium flow rate, suitable for inorganic and electrophoretic separations. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	£5·00	7·25	f

CK-530

CHROMATOGRAPHY PAPER, Grade 3MM, a soft smooth, thick paper, suitable for inorganic separations and where large quantities of test solution are to be analysed. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	£4·05	6·05	f

CK-535

CHROMATOGRAPHY PAPER, Grade 3MM, as CK-530, but supplied in 100 metre roll 5 cm wide.
Each **£0·75** f

CK-540

CHROMATOGRAPHY PAPER, Grade 4, a faster running paper than Grade 1 but of the same thickness. Ensures fast development times when using slow running solvents and suitable for the analysis of amino acids and sugars. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	£3·25	4·90	f

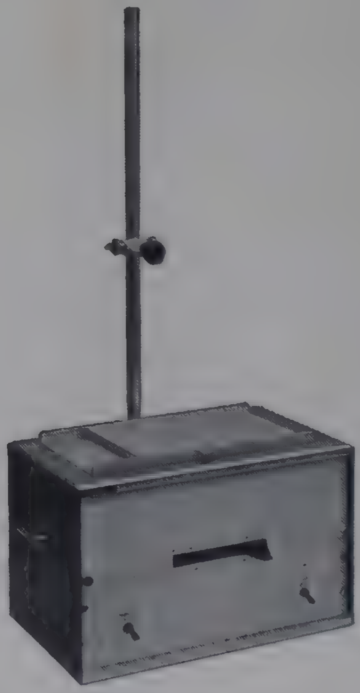
CK-580

CHROMATOGRAPHY PAPER, Grade 54, a hardened version of Grade 4, of high wet strength. Suitable for two dimensional chromatographic separations of sugars. Recommended for impregnation with absorbents such as alumina, starch and magnesia. Supplied in pack of 100 sheets, 46 × 57 cm ... ... Pack **£6·93** f

LH-540

Chromatography Ultraviolet Lamp suitable for the examination of chromatograms. Designed to scan horizontally and vertically.

For details and price see LH-540 in List No. sequence.



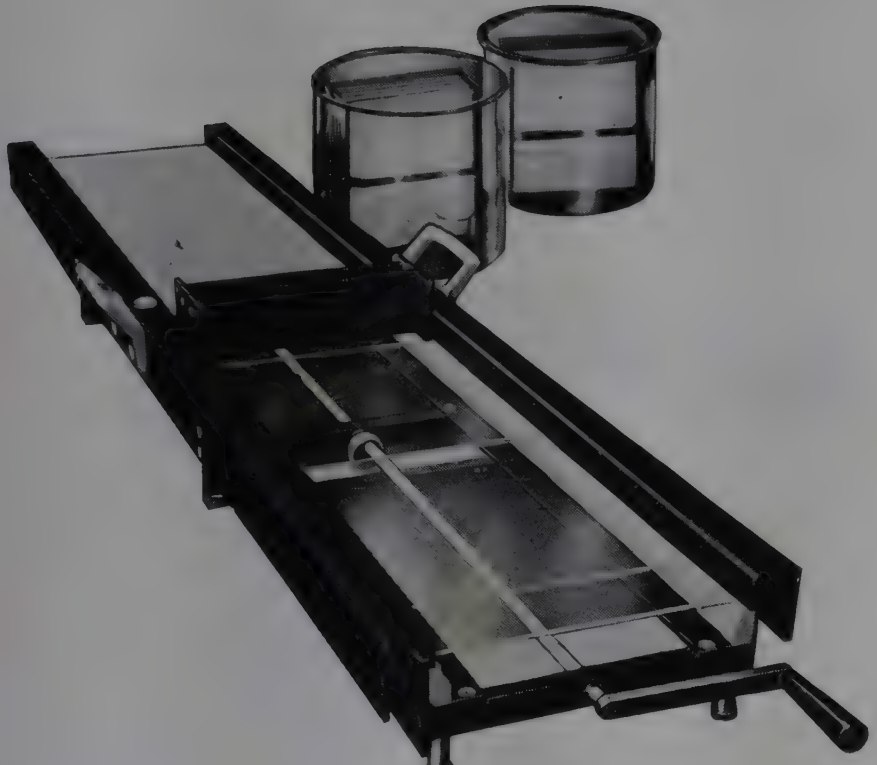
LH-600

Chromatography Viewing Cabinet providing uniform ultraviolet and tungsten illumination suitable for examining and photographing paper and thin layer chromatograms.

For details and price see LH-600 in List No. sequence.

All items on this page normally available from stock.

THIN LAYER CHROMATOGRAPHY



CK-780

CK-780

T.L.C. APPARATUS, *Quickfit* **No. 8CR.** A complete outfit for carrying out thin layer chromatography experiments quickly, economically, and accurately. The outfit is designed for use with glass plates 20 × 20 cm which can be processed in batches of five. The spreader has four accurately machined slots for coating plates with absorbent layers 0·25, 0·5, 0·75 and 1·0 mm thick. The plastics spotting template is notched for sample application points 10 and 15 mm apart, and is ruled at 5 mm intervals for measuring Rf values on developed plates.

Outfit comprises:

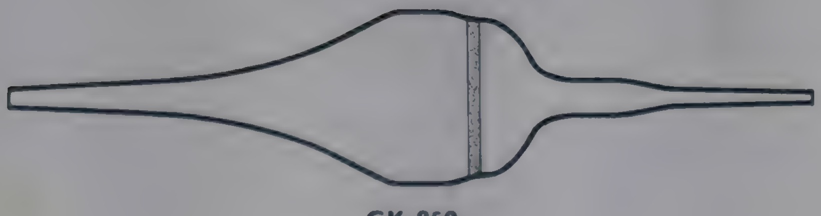
Quantity	Ref. No.	Description
1	CR7/1	Automatic plate leveller
1	CR7/2	Spreader
2	CR7/3	Plate rack for plates 20 × 20 cm
1	CR7/4	Spotting template
1	CR7/5	Scriber
2	CR7/6	Developing tank/desiccator
2	CR7/7	Tank lid
2	CR8/5	Glass plate, 20 × 5 cm
2	CR8/10	Glass plate, 20 × 10 cm
10	CR8/20	Glass plate, 20 × 20 cm
1	7CR	Spray, complete
1	PM5/1	Micropipette, 0·005 ml subdivided 0·001 ml
1	PM10/2	Micropipette, 0·010 ml subdivided 0·0025 ml
1		Sample pack of Chromedia cellulose powder CC41

Each **£73·00** *f*

REPLACEMENT PARTS

CK-784	**Automatic plate leveller,** CR7/1	Each	**£33·00**	*f*
CK-785	**Spreader,** CR7/2	Each	**£10·00**	*f*
CK-787	**Rack,** CR7/3, for plates 20 × 20 cm	Each	**£4·60**	*f*
CK-789	**Spotting template,** CR7/4	Each	**£2·87**	*m*
CK-791	**Developing tank/desiccator,** CR7/6	Each	**£6·75**	*m*
CK-792	**Tank lid,** CR7/7	Each	**£0 85**	*m*
CK-794	**Plate,** 20 × 5 cm, CR8/5	Pack of 20	**£2·50**	*f*
CK-796	**Plate,** 20 × 20 cm, CR8/20	Pack of 10	**£2·43**	*f*
CK-798	**Micropipette,** 0·005 ml, PM5/1	Each	**£0·75**	*m*
CK-799	**Micropipette,** 0·010 ml, PM10/2	Each	**£0·75**	*m*
CK-801	**Spray, complete,** 7CR	Each	**£2·43**	*m*
CK-802	**Spray, head only,** CR7/9	Each	**£1·10**	*m*

SPOT COLLECTOR FUNNEL



CK-850

CK-850

SPOT COLLECTOR FUNNEL Ⓐ. An aerodynamically shaped bulb in borosilicate glass with a porosity 3 sintered disk sealed across the centre. A vacuum line is attached to one end of the bulb and the other end is used, rather like a pen, to scrape the spot from the plate. The powder is sucked into the collector and deposited on the sintered disk. After removing the air line, the powder can be rinsed out into a suitable container for UV or spectrophotometric analysis. Overall length 20 cm, plate diameter 40 mm ... Each **£3·50** *a*

All items on this page normally available from stock.

COLUMN CHROMATOGRAPHY

CHROMATOGRAPHY COLUMNS

Regd.

CL-100

CHROMATOGRAPHY COLUMNS, borosilicate glass. A range of glass columns for gravity elution. Each column is fitted with a sintered glass support disk of porosity 1 at the lower end, and has a 19/26 socket with spring hooks for dropping funnels to be attached.

Length Dia.	40 1·0	40 2·0	40 3·0	80 cm 2·0 cm	
Ten	**£18·00**	**21·00**	**25·50**	**30·00**	*a*
Each	**£ 2·00**	**2·35**	**2·85**	**3·40**	

CL-102

CHROMATOGRAPHY COLUMN, borosilicate glass, as CL-100, length 40 cm, dia. 3 cm **but with a fused-on water jacket** ... ... Each **£6·00** *a*

CL-120

CHROMATOGRAPHY COLUMN, borosilicate glass, for gravity elution. Surmounted by a 50 ml reservoir with a 14/15 socket for ground glass stopper and having a straight-bore stopcock. Int. dia. 10 mm, length 18 cm.
Ten **£25·50** Each **£2·85** *a*

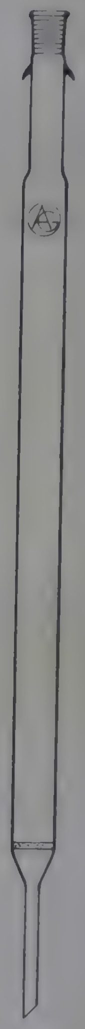
CL-130

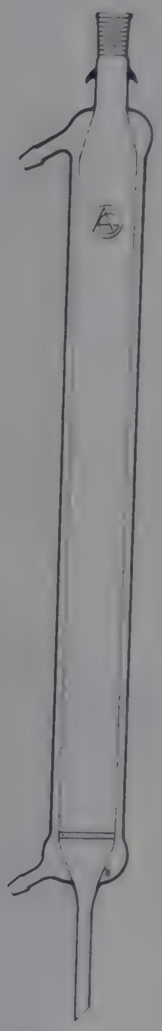
CHROMATOGRAPHY COLUMN, borosilicate glass, for suction elution, particularly suitable for separations of methylated oestrogens. Surmounted by a 40 ml reservoir and with a sintered disk, porosity 4, fused into the lower end to support the column packing. A 19/26 cone with pump connection surrounds the delivery tube and allows the elutriate to be collected in flasks having 19/26 sockets. Int. dia. 10 mm, length 50 mm ... ... Ten **£25·50** Each **£2·85** *a*

CL-140

CHROMATOGRAPHY COLUMNS, borosilicate glass, for pressure elution. The jacketed columns have an effective length of 40 cm and are terminated by screw joints with ptfe inserts for connection to glass or metal tubing.

Diameter (internal)	11·5	16·5 mm	
Diameter through screw thread	7–8·5	10–11·5 mm	
Ten	**£21·50**	**25·00**	*a*
Each	**£ 2·40**	**2·80**	


CL-100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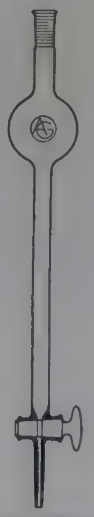
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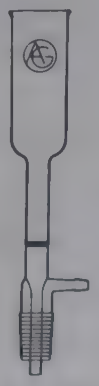
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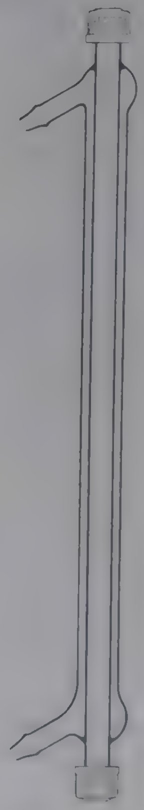

CL-140

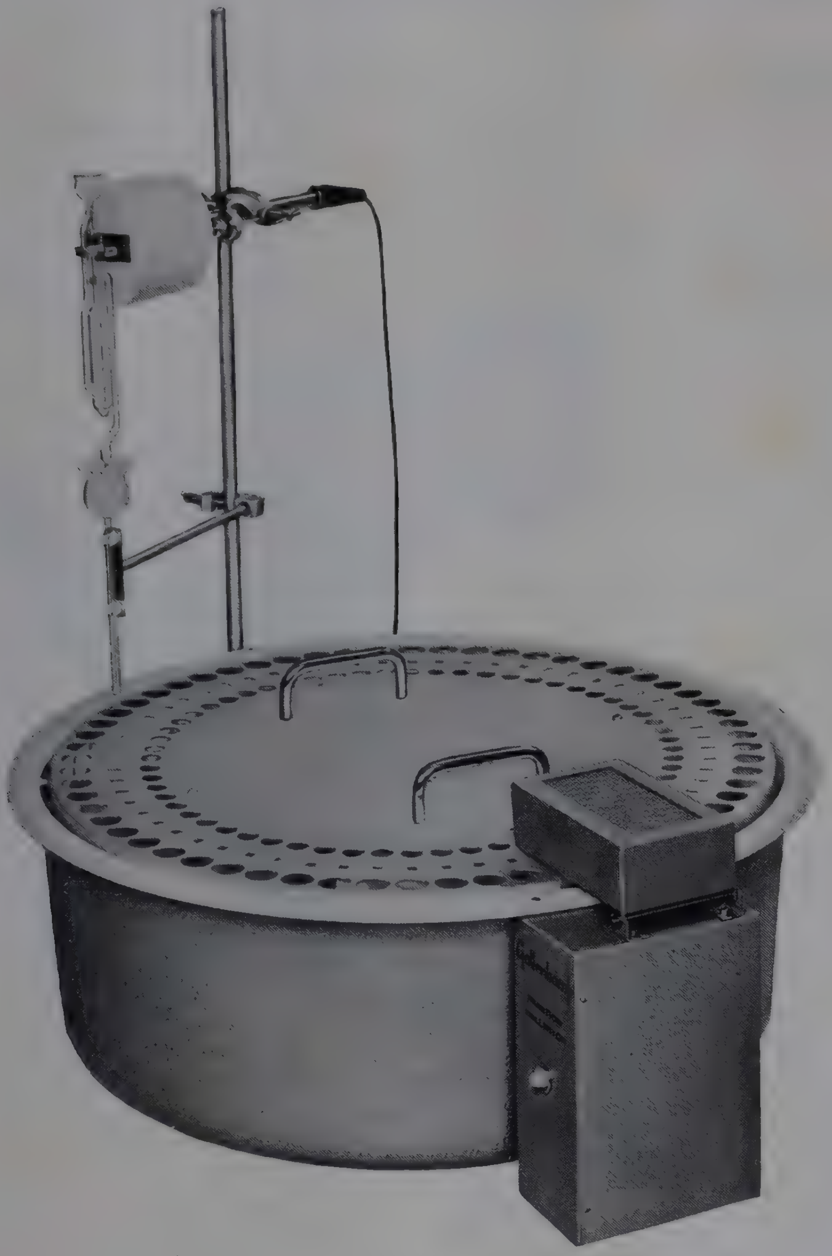
Porous polythene sheet, for use as support plates in chromatography columns—see PP-630 in List No. sequence.

Peristaltic pumps, for use with chromatography columns—see WM-200 et seq. in List No. sequence.

All items on this page normally available from stock.

Gallenkamp FRACTION

A versatile, electrically safe, spillproof fraction collector which offers volumetric or timed flow fraction cutting simply by the selection of the appropriate module.



CL-270

- **Collector plate rotated by self-locating rim drive**
- **Self-standing collector plate for collecting up to 60 fractions in either 12 mm (½ in) or 19 mm (¾ in) dia. rimmed test tubes**
- **Bowl construction with drain cock contains no mechanisms; provides large spillage capacity and protects tubes from damage**
- **Low voltage electrical circuits throughout**
- **Fraction cutting by Siphon balance 1 to 25 ml or Timer 1 to 45 min**
- **Automatic arrest at end of track with facility for warning or stopping flow of eluent**
- **Swing-up drive arm allows collector plate to be loaded or removed in seconds**

BOWL, COLLECTOR PLATE AND DRIVE MECHANISM

Bowl construction provides exceptionally large capacity for spillage and protection for the tubes. There are no mechanisms, bearings or circuits within the bowl. The inside of the bowl is finished in chemically resistant enamel and a drain cock is fitted.

The interchangeable collector plates can be stood on any level surface without removing the sample tubes. This facility allows the user to remove one plate of filled tubes and replace it within seconds by another plate of empty tubes to continue the collection.

The rim-drive system of advancing the collector plate ensures that no electrical or mechanical damage results from interference with the drive cycle. The drive mechanism operates on a 24V supply for maximum safety.

A transparent rigid plastics dome cover which fits over the collector plate to protect the samples from dust is available as an accessory.

DIMENSIONS AND WEIGHT

Bowl diameter	60 cm
Overall height	70 cm
Weight, net	8 kg

METHODS OF FRACTION CUTTING

By Volumetric Fractions

The siphon delivers its calibrated volume by siphoning when filled. The siphon is mounted on a balance which tilts when the siphon has half filled or half emptied. The collector plate advances by one tube each time the balance tilts during the siphon filling cycle and a logic circuit prevents its movement at any other time. Siphons with capacities from 1 to 25 ml are listed under List Nos. CL-286 and CL-288.

By Timed Fractions

The timer allows the eluent to flow into each tube for a predetermined time after which the collector plate advances to the next tube.

It can be set to any required interval between 1 and 45 minutes. It is fitted with a *Reset* switch which automatically returns the mechanism to zero prior to resetting the operating period. Fail-safe devices are built-in to prevent the timer damaging itself mechanically in the event of an electrical breakdown.

Timed flow permits fractions to be collected *directly off the end of the chromatography column* where this is important to reduce the effects of "tailing", e.g. with radio-active tracer investigations.

COLLECTOR

The design calls for the absolute minimum of maintenance and all components are readily accessible for servicing. Please note that this Fraction Collector is suitable for use only with *rimmed* test tubes.

OUTFITS

CL-270

FRACTION COLLECTOR OUTFIT, for volumetric collection comprising collector with drive assembly, collector plate for rimmed tubes, support rod, siphon balance with 5 ml aqueous siphon and bosshead, funnel with clamp and bosshead and 3 spare rubber drive wheels. For 110/120V and 200/240V 50 Hz single phase supplies. Each **£78·00** *b*

For other siphons see CL-286 and CL-288 in List No. sequence.

CL-272

FRACTION COLLECTOR OUTFIT, for timed flow collection comprising collector with drive assembly, collector plate for rimmed tubes, support rod, timer and 3 spare rubber drive wheels. For 110/120V and 200/240V 50 Hz single phase supplies ... ... Each **£105·00** *b*

CONVERSION KITS

CL-278

KIT TO CONVERT CL-270 to CL-272 comprising timer module. For 110/120V and 200/240V 50 Hz single phase supplies ... ... Each **£43·00** *b*

CL-280

KIT TO CONVERT CL-272 to CL-270 comprising siphon balance with bosshead, 5 ml aqueous siphon and funnel with bosshead and clamp ... Each **£16·00** *b*

REPLACEMENT PARTS

CL-286 **Siphons, glass,** for use with siphon balance of CL-270 and CL-280. To deliver the stated volume of aqueous solutions.

Volume	1	2·5	5	10	25 ml	
Each	£1·40	1·40	1·40	1·45	1·55	*a*

CL-288 **Siphons,** as CL-286 but to deliver stated volume of non-aqueous solutions.

Volume	1	2·5	5	10	25 ml	
Each	£1·40	1·40	1·40	1·45	1·55	*a*

CL-292 **Collector plate,** with 60 holes for 12 mm tubes and 60 holes for 19 mm tubes. For rimmed tubes only. Each **£11·00** *b*

FP-650 **Funnel,** for use with siphon balance. For details see entry in List No sequence.

ACCESSORIES

CL-296 **Cover,** transparent rigid plastics, to protect the collector plate from dust during long collection periods. Each **£5·80** *b*

TF-100
TF-180
TF-184
Test tubes, rimmed, up to 150 mm long; 12 mm and 19 mm diameter.
For prices see entries in List No sequence.

FRACTION COLLECTOR TIMER MODULE
Gallenkamp
0
10
20
30
40
minutes
reset indicator
reset
run

CL-278

Instruments for anlysis of fractions see

- **SPECTROPHOTOMETERS**
- **COLORIMETERS**

Gallenkamp COLORIMETER

Gallenkamp COLORIMETER

CS-200

- **Rapid response—stable readings**
- **Simple to operate and maintain**
- **Reads optical density direct**
- **Optional flowthrough cell**

For full details see entry in List No. sequence.

All items on this page normally available from stock.

FRACTION COLLECTING APPARATUS

ULTRORAC FRACTION COLLECTOR

The *UltroRac* is compact and space saving yet it offers all the facilities required of a fraction collector. Fully loaded, it has a capacity of 200 tubes in racks of 10 which, as they become filled, can be replaced by racks of empty tubes. Fraction changes are initiated either by timed flow or drop counting, or by a siphon accessory. The operational controls are built into a single hermetically sealed control unit which can be removed from the collector for its remote operation in, for example, a refrigerator.

The polypropylene tube racks fold at the middle in order to stand firmly when removed from the carrier or storage tidy. Stainless steel is used for the support rods and all parts likely to come into contact with liquids. Plastics dust covers are provided to protect all tubes during operation. A model is available fitted with a valve which stops the flow of liquid if the electricity supply fails.

TECHNICAL DATA

Operational temperature range	0 to 45°C
Timed flow interval	0·1 to 99·9 minutes
Drop count interval	1 to 999 drops
Siphon capacities	5 or 25 ml
Auto switch-off	Operates after 1 to 99 racks (preset)
Duration of fraction change	2 seconds approximately
Tube sizes; diameter	15 to 18 mm
length	75 to 200 mm
Event marking	Internal contacts close for 1·2 sec at each fraction change.
Dimensions overall with 160 mm tubes	H W D 34 × 34 × 50 cm

***CL-430**

FRACTION COLLECTOR, *LKB UltroRac*, as specification with drop counter head, ptfe tubing, 20 tube racks, 20 rack carriers, 2 dust covers and rods, rod for drop counter head, adapter cable for recorder CL-780, 2 rack trays, 2 stainless steel support rods, tools, fuses and instructions manual.

For 200/240V 50 Hz single phase supplies.

Each (without cut-off valve) **£445·00** *f*

Each (with cut-off valve) **£476·00** *f*

CL-430

UVICORD ABSORPTIOMETERS

High stability, precision UV absorptiometers for continuous flow monitoring. *Uvicord I* operates at 254 mμ and *Uvicord II* at 254 or 280 mμ. For cold room use *Uvicord I* requires a small cold room attachment but *Uvicord II* can operate in ambient temperatures of 0–30°C without modification.

***CL-740**

ABSORPTIOMETER, ultraviolet, *LKB Uvicord I*, comprising an optical unit with phototube, UV lamp, black glass filter, nickel sulphate liquid filter for 254 mμ operation, 3 mm optical path quartz flow cell, and cell connector assembly and a control unit incorporating the lamp stabiliser and the d.c. amplifier with outputs for a 0–0·3 milliampere galvanometer recorder or a 10 or 100 mV potentiometric recorder. Supplied with 2 metres ptfe connecting tubing, two flanging tools, spare UV lamp, fluorescent rod and instructions manual. For 200/250V a.c. single phase supplies. **Without recorder.**

Each **£305·00** *f*

When ordering please state voltage and frequency of supply.

ACCESSORY

***CL-745** **Coldroom attachment,** comprising heating element, transformer and insulation for UV lamp. For 220/240V a.c. single phase supplies only ... ... Each **£19·50** *f*

When ordering please state voltage and frequency of supply.

***CL-760**

ABSORPTIOMETER, ultraviolet, *LKB Uvicord II*, comprising a detector unit with photoelectric detector and high impedance amplifier, low pressure mercury UV lamp, black glass filter, interference filters for 254 and 280 mμ, 3 mm optical path quartz flow cell, and cell connector assembly and an electrical unit with the lamp stabiliser and outputs for a 0–0·3 mA milliampere galvanometer recorder or a 10 or 100 mV potentiometric recorder. Supplied with 2 metres ptfe connecting tubing, flanging tool, spare UV lamp, fluorescent rod and instructions manual. For 200/250V a.c. single phase supplies. **Without recorder** ... ... Each **£565·00** *f*

When ordering please state voltage and frequency of supply.

RECORDER

***CL-780**

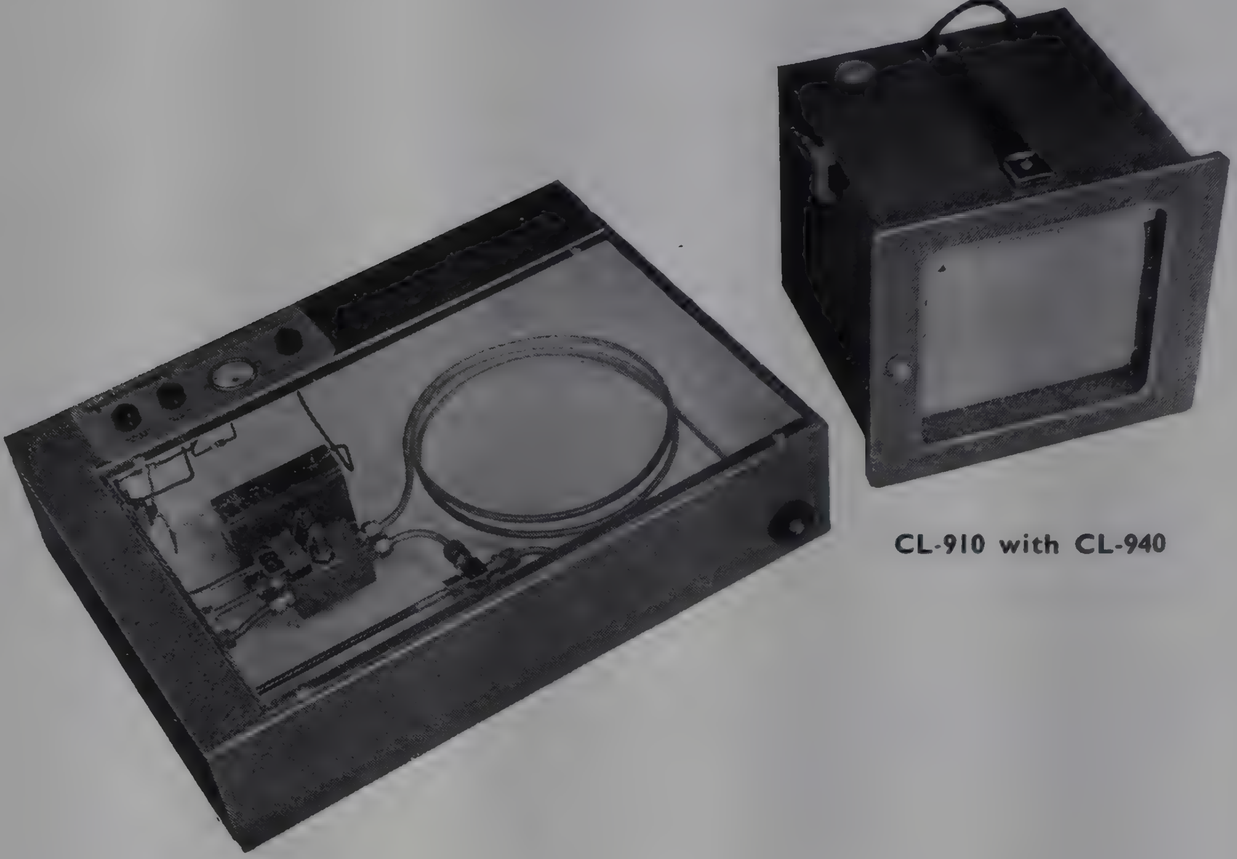
RECORDER, CHOPPER BAR GALVANOMETER TYPE, single channel, suitable for use with *Uvicords* CL-740 and CL-760. Supplied with 3 rolls of chart paper, printing ribbons, and connecting cables for signal and event marker inputs. For 220/240V a.c. single phase supplies.

Chart width, mm	140
Chart speeds, mm/hr	10, 20 and 60
Accuracy	±1·5% of full scale
Printing interval	20 seconds between dot marks
Event marking	Contact closure to actuate colour changing mechanism
Range, mA d.c.	0–0·3
Internal resistance, ohms	500

Each **£220·00** *f*

Gallenkamp JUNIOR GAS CHROMATOGRAPH

- Ideal for educational purposes
- Suitable for routine analyses
- Simple controls—battery operation
- For use with galvanometer or recorder
- Open layout—full view window
- For liquids with boiling points up to 80°C



CL-910 with CL-940

The *Gallenkamp* Junior Gas Chromatograph is intended for use in universities and technical colleges where the teaching of basic concepts of gas chromatography is an important introduction to the subject. It may be used both for demonstrations or individual experiments and enables the student to carry out analyses of unknown mixtures and to investigate the effects of varying the operating parameters. A teaching manual describing nine experiments is supplied and extra copies are available. By careful design the response is practically linear, undesirable characteristics such as tailing of peaks and zero drift have been minimised, and the apparatus is thus also suitable for simple applications in fields other than teaching.

DESIGN FEATURES

Sample injection. A hypodermic syringe is used to inject gas or liquid samples through a gastight, replaceable silicone rubber seal. A range of suitable syringes is listed under accessories.

Column. The standard instrument incorporates a 120 cm general purpose column packed with silicone impregnated Celite. For convenience the column is coiled and connected to the gas flow system by screw couplings. Unfilled columns to a maximum length of 360 cm are available, each with full packing instructions.

Gas flow system. Annealed copper tubing is used throughout. The reference stream is balanced to the column stream by means of a fine needle valve and provision is made for connecting to flowmeters if gas flow needs to be measured accurately. For most purposes, because of its ready availability and chemical safety, nitrogen is preferred as a carrier gas, but other gases may be used if required. A two stage diaphragm pressure regulator is essential for steady flow of the carrier gas.

Detector. For simplicity and versatility, a robust katharometer detector is used. Special care has been taken in the design of this component in order to minimise baseline drift and temperature sensitivity. The sensing elements are a pair of matched thermistors incorporated in a d.c. bridge which is supplied by a 4·5V long life dry battery. A rheostat and a small milliammeter are provided for the control and measurement of bridge currents.

External connections. No tools are needed to set up the apparatus. External gas connections are by rubber tubing nozzles, terminals are provided for galvanometer or recorder leads and flying leads connect the internal dry battery.

Bibliography

'A programmed introduction to gas-liquid chromatography', B. Pattison. Pub: Heyden, London. 1969.

Gallenkamp JUNIOR GAS CHROMATOGRAPH

(continued)

SUITABLE FOR INVESTIGATING:

Retention times and volumes for individual organic solvents.
Effects of varying the katharometer bridge current.
Effects of varying the carrier gas flow rate.
Effects of varying column length.
Simple solvent and vapour mixtures.
Comparison between peak height and peak area methods.
Effects of changing the column packing.

TECHNICAL DATA

For the guidance of the prospective user, the following approximate values give satisfactory results when the chromatograph is used with a 5 mV recorder. These values do not represent the full range of the instrument and precise values will depend upon individual columns and samples.

Bridge current	5 mA
Gas flow	20–100 ml/min
Sample volume—Liquids	10 µl
Gases	0·5–1 ml
Detection limit	10^{-7} g

CL-910

GAS CHROMATOGRAPH, Junior, *Gallenkamp*, as specification, complete with 4·5V battery, instructions for use and teaching manual CL-928 but without galvanometer or recorder, pressure regulator or flowmeters. Each **£81·00** *b*

REPLACEMENT PARTS

CL-915	**Column,** 120 cm, general purpose silicone.	Each	**£2·25**	*b*
CL-921	**Thermistors,** matched pair in special mounts, packed with protective sleeves	Pair	**£28·00**	*b*
CL-924	**Battery,** *Ever Ready* No. 126, 4·5V ...	Each	**£0·20**	*m*
CL-926	**Injection port seals,** silicone rubber.	Pack of 10	**£0·55**	*c*

ACCESSORIES

CL-928	**Teaching manual, 'Experiments in Gas Chromatography'.** A useful booklet describing nine experiments designed to introduce the student to the basic principles and practical applications of gas chromatography.	Each	**£0·25**	*f*

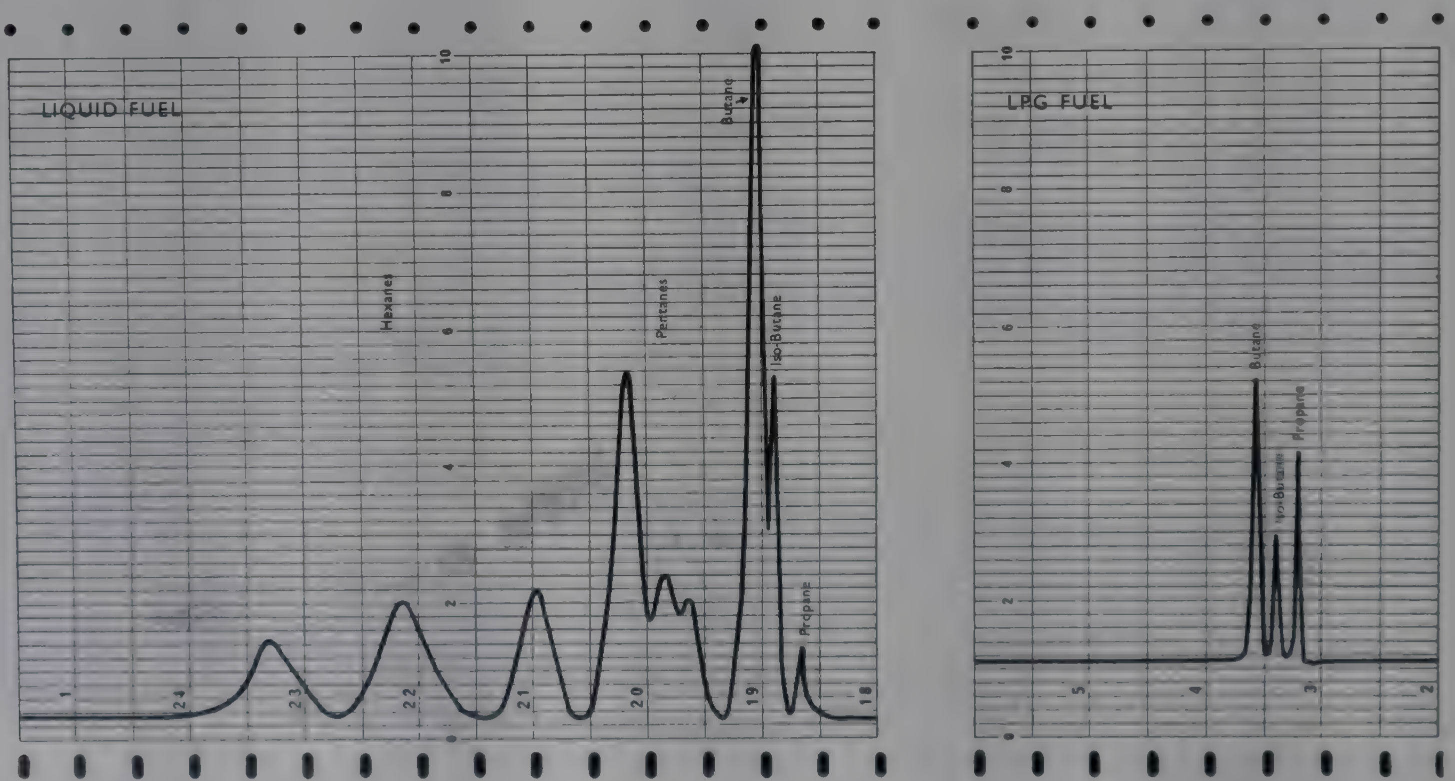
CL-930 **Columns,** unfilled, complete with couplings.

Length	120	360 cm	
Each	**£1·25**	**2·10**	*b*

AB-940	**Absorption tube,** in-line, for drying carrier gas	For prices see entries in List No. sequence.
FL-550	**Flowmeter,** 0-100 ml/min (2 required) ...	
GD-530	**Pressure regulator,** variable	
TX-625	**Tubing,** pressure, 6·3 mm i.d. recommended for connecting between the pressure regulator and carrier input nozzle ...	
CP-285	**Clip,** hose, 17/13 mm recommended to ensure a gastight seal between the hose and nozzle	
EF-203	**Galvanometer,** suitable for indicating the chromatograph output	

CL-940	**Strip chart recorder,** *Control Instruments.* High speed, single point continuous record, 1·3 sec full scale deflection. Input 500µV d.c. with plug-in range unit for 5 mV and event marker. Chart speeds 15, 30 and 60 in./hr. A simple slot in the case, without drive mechanism allows the chart to be fed out on to the bench, if required. For 200/260V 50 Hz supplies.	Each	**£195·50**	*f*
CL-941	**Chart rolls,** for CL-940, calibrated width 6 in, subdivided in 50 divisions. Time scale marked at ½ in intervals	Each	**£1·00**	*f*
CL-945	**Needles,** all metal, size No. IV for use with SY-410 and SY-430	Pack of 10	**£0·75**	c

SY-410	**Syringe,** 1 ml, for sample injection in work of low accuracy	For prices see entries in List No. sequence.
SY-430	**Syringes,** plastics	
SY-500	**Microlitre syringe,** for the precise measurement of liquid samples. Capacity 50 µl, subdivided in 1 µl subdivisions. With ground fitting to accept Luer pattern needles	
SY-520	**Gastight syringe,** for the introduction of precisely measured gas samples. Capacity 0·5 ml, subdivided in 0·01 ml subdivisions. With ground fitting to accept Luer pattern needles	
SY-550	**Needle, syringe,** for use with SY-500 and SY-520, Luer fitting with axial point to reduce the tearing of injection port seal	



Comparison carried out on a Junior Gas Chromatograph between liquid and LPG lighter fuels.

All items on this page normally available from stock.

ANALYTICAL CHROMATOGRAPHS

A range of chromatographs designed on modular principles with certain components common to all versions, enabling changes to be made from one system to another by the addition or replacement of one or more modules.

BRIEF DESCRIPTION OF PRINCIPAL MODULES

Analyser Oven. This is the basic module of the Series 104 range, other modules and accessories being added to form specific chromatographs. The oven is heated by air which is forced rapidly over a low thermal inertia 1·6 kW heater controlled by a platinum resistance thermometer/SCR circuit. Control and stability of temperature are 50°C to 350°C (±0·05°C) for katharometer models and 50°C to 500°C (±0·1°C) for flame ionisation detector models. Maximum heating rates for 4 mm bore packed columns vary from 48degC/min up to 150°C, to 16degC/min from 325° to 450°C.

Detector Heads

(a) Flame ionisation heads. Four assemblies are available—single and double, heated and unheated. Each assembly or head comprises the one or two detectors with gas lines and electrical connections, the heated heads incorporating a small detector oven controlled by an SCR. The detector jet is insulated from earth and a 180V polarising voltage is applied. The electrical circuit at the detector top is anti-microphonic and each detector top is fitted with a platinum igniter filament.

(b) Katharometer heads. Two versions are available—heated and unheated. Each comprises a four filament detector with an SCR—controlled to ±0·1degC oven in the heated version. The filaments are of tungsten (nominal cold resistance 40Ω), fitted in matched pairs. The detector has a built-in splitter and does not rely on diffusion. These heads have a maximum operating temperature of 350°C.

Programmer/Controller to control the temperature of the analyser oven in accordance with a preset adjustable programme. The most complex such programme is an initial timed isothermal period followed by a period of linear increase in temperature followed by a final isothermal period.

Initial and final isothermal periods of 0–36 min (with infinity setting for final period) are provided and rates of temperature increase programmes are from 1degC/min to 48degC/min in twelve settings.

Column Oven and Detector Oven Controllers to control the temperatures of the analyser oven and detector between 50 and 500°C.

Ionisation Amplifier to be used with the flame ionisation detector. The amplifier produces an ignition and a stable polarising voltage for flame ionisation operation and amplifies the detector signal to give a f.s.d. for 5×10^{-7}A minimum to 1×10^{-12}A maximum sensitivity.

Zero suppression and attentuation from 1 to 5×10^{5} are provided.

Katharometer Supply. A transistor-stabilised full wave rectifier supplying up to 100 mA at about 23V to the katharometer filaments. The module is fitted with a precision 10-position output attenuator ranging from 1 to 1000, a polarity switch and a chart event marker switch.

CM-230 with CM-250

COMPLETE OUTFITS

CM-200

GAS CHROMATOGRAPH, Model 4, *Pye Unicam*, isothermal with flame ionisation detector.
U.K. Each **£533·00** *f*

CM-215

GAS CHROMATOGRAPH, Model 34, *Pye Unicam*, isothermal with katharometer detector.
U.K. Each **£517·63** *f*

CM-220

GAS CHROMATOGRAPH, Model 44, *Pye Unicam*, temperature programmed with heated katharometer detector ... ... U.K. Each **£789·25** *f*

CM-230

GAS CHROMATOGRAPH, Model 64, *Pye Unicam*, temperature programmed with heated dual flame ionisation detector ... ... U.K. Each **£850·75** *f*

NOTE 1:

All the above outfits are suitable for 210/250V 50 Hz supplies. Available for other supplies to special order.

NOTE 2:

Each of the above outfits requires, but does not include, a stripchart recorder.

RECOMMENDED RECORDER

CM-250

RECORDER, *Leeds and Northrup Speedomax W/Pye.*
U.K. Each **£281·87** *f*

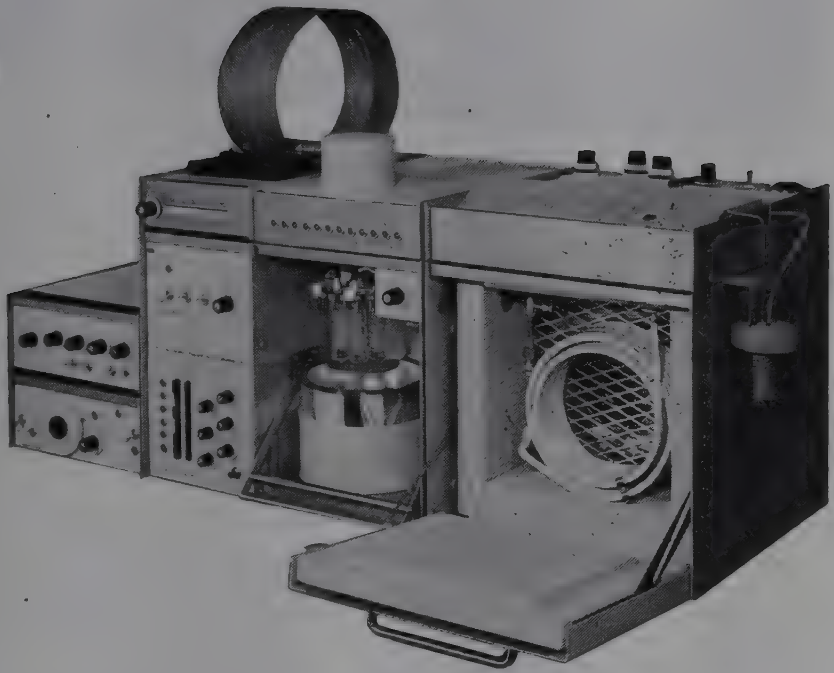
EF-680

STRIPCHART RECORDER may also be used. Details and price see entry in List No. sequence.

Export prices for the above chromatographs and recorders on application.

Special purpose module combinations are available, e.g. for steroid and pesticide testing. Details on request.

PREPARATIVE CHROMATOGRAPHS



CM-270

The *Pye Unicam* automatic preparative gas chromatograph separates and collects relatively large quantities of pure specimens from organic mixtures and simultaneously produces a chromatogram on a recorder.

Automatic sample injection, collection and temperature programming are controlled by easily programmed tapes. The design of the Series 105 instrument is based on the Series 104 analytical chromatographs and many modules are common to both series.

BRIEF DESCRIPTION OF PRINCIPAL MODULES

Analyser Oven. This has a maximum operating temperature of 500°C with a maximum automatic programming rate of 24°C/min. It is fitted with an automatic door opening and closing mechanism.

Injection System. The sample vessel has a capacity of 50 ml. Minimum sample size is 100 μl; maximum sample size is dependent on the resolving efficiency of the column.

Flame Ionisation Head and Amplifier. The detector has a linear range from 10^{-14}A to 2×10^{-7}A. Amplifier sensitivity ranges from 10^{-12} to 5×10^{-7}A f.s.d. with outputs 1mV or 10mV. Noise level is less than 0·2% f.s.d. on 10^{-11}A range and above.

Automatic Sequence Controller. Tapes can accept an infinite variety of programmes and can be stored indefinitely to enable the programme for any particular analysis to be readily available. Tape loops may be made for continuous repetitive analysis.

Collection Unit. This holds up to twenty-four traps suspended in a Dewar vessel. Pure eluted components from the column are split so that 99% passes to the collection traps via a heated (350°C maximum) outlet and the remaining 1% flows to the detector.

CM-270

GAS CHROMATOGRAPH, Series 105, *Pye Unicam*, outfit with flame ionisation head and temperature programmed column, includes 10 metres empty glass column and twenty-four traps of which six are high efficiency types.
U.K. Each **£1527·00** *f*

RECOMMENDED RECORDER

CM-250

RECORDER, *Leeds and Northrup Speedomax W/Pye.* For price see entry in List No. sequence.

Export prices for the above chromatograph and recorder on application.

Pye Unicam, **Series 106, Model 6, AUTO SOLIDS INJECTION CHROMATOGRAPH** for analyses of steroids and other non-volatile samples. Details on request.

Gallenkamp Laboratory CLAMPS AND BOSSHEADS

SM-600

SM-610

- Corrosion resistant diecastings throughout
- No iron parts to rust
- Clamps accept 2 mm to 90 mm diameter articles
- Bossheads take rods up to 16 mm diameter in each jaw
- High quality at low price

See SM-600 et seq. in List No. sequence.

CLOTHS AND TISSUES

CM-510

CLOTH, wiping, resin bonded cellulose fibre. Soft in texture and absorbent, these cloths may be used dry or moistened for wiping and light cleaning purposes. They will withstand careful washing. Size 50×25 cm in pack of 50 ... ... Five packs **£3·70** Pack **£0·80** c

CM-520

CLOTH, glass drying, linen, 85×60 cm.
Ten **£3·30** Each **£0·39** *m*

CM-530

CLOTH, dusting, blue check cotton, 60 × 60 cm.
Ten **£1·80** Each **£0·25** *m*

CM-535

CLOTH, dusting, yellow flannelette, 45 × 50 cm.
Ten **£0·90** Each **£0·16** *m*

CM-550

CLOTHS, polishing, Selvyt.

Size	25×25	47×42 cm	
Ten	**£2·15**	**6·00**	*m*
Each	**£0·28**	**0·66**	

CM-556

CLOTH, polishing, antistatic, 55 × 40 cm, for dissipating electrostatic charges formed on non-conducting surfaces. Suitable for all plastics ware and lenses. Packed in polythene envelope.
Ten **£3·60** Each **£0·42** c

CM-560

CLOTH, swabbing, open net cloth, 55×45 cm.
Ten **£0·40** Each **£0·13** *m*

CM-590

LEATHER, CHAMOIS, natural skin in cuts of approximately 27 × 30 cm.
Ten **£3·40** Each **£0·40** c

CM-620

SPONGES, *Spontex*, absorbent cellulose, approximately 14 × 11 × 4 cm when wet.
Ten **£2·10** Each **£0·27** *m*

CM-650

PAPER TISSUES, white, absorbent, for general laboratory use. In boxes of approx. 150 pulls, 2 ply tissue approx. 23×20 cm.
24 boxes **£2·40** 10 boxes **£1·04** *m*
Box **£0·17**

CM-655

PAPER TOWEL. A heavy duty 2-ply paper suitable for wiping, drying and cleaning purposes. In perforated roll comprising 100 tear-off sheets, each sheet measuring approximately 45×25 cm. Without holder.
18 rolls **£7·00** Roll **£0·46** c

ACCESSORY

CM-656 **Holder,** wall mounting, comprising metal rod frame and dust flap. Accepts one roll CM-655 ... Each **£1·45** c

CM-660

TISSUE, lens cleaning, *Greens* **No. 105.** 30×20 cm sheets supplied in boxes of 100.
10 boxes **£4·50** Box **£0·50** *m*

CM-662

TISSUE, lens cleaning, *Greens* **No. 105.** In pack of 50 books. Each book contains 10 sheets 10×8 cm.
10 packs **£11·10** Pack **£1·35** *m*

CLEANING COMPOUNDS

CM-742

CLEANSER, *By-Prox*, a liquid detergent equally effective in hard, soft and salt water. Removes grease films and cleans surfaces leaving a bright finish. Supplied in cans.

Contents	1 4·5	4 gal 18 litres	
Each	**£0·80**	**2·75**	c

CM-751

CLEANSING FLUID, *Decon* 75 **concentrate.** A powerful, bio-degradable, non-corrosive, general purpose laboratory surfactant with a pH of 10 in 2% solution. Will remove stubborn contaminants such as silicone and Apiezon oils and greases, polymer resins, blood, tars, cedarwood oil, Canada balsam and various other substances not removed by water, ordinary solvents or acid cleaning mixtures. Cleans glass, metal and plastics laboratory apparatus without leaving a trace of residue after rinsing. Decon 75 solutions have no deleterious action on skin, clothing, glass, plastics, rubber, quartz, silica or fabrics and present no disposal problems. The concentrate has anti-bacterial properties particularly suitable for use in pathology and bacteriology laboratories and tissue culture and enzymological equipment can be cleaned without fear of any temporary or cumulative toxic effects. Recommended for use with ultrasonic cleaners and for decontamination from radioactive isotopes. Supplied in screw cap plastics bottle containing 8 fl. oz (225 ml).
Six bottles **£4·00** Bottle **£0·72** *m*

CM-752

CLEANSING FLUID, as CM-751 but supplied in polythene bottle containing 5 kg (approx. 1 gal).
Each **£8·75** *m*

CM-760

CLEANSER, for stainless steel. Cleans and polishes the surface when applied with wet cloth. Supplied in dispenser containing 2¾ oz (78 g) of powder.
Each **£0·27** *m*

POLISHES

CM-770

POLISH, wax, *Gallenkamp*, specially prepared for the preservation and polishing of laboratory bench tops and furniture. Pure wax dressing resistant to most acids and alkalis. Supplied in tins.

Contents	13½ oz 380 g	7 lb 3 kg	
Each	**£0·20**	**1·05**	c

CM-775

POLISH, wax, *Gallenkamp*, with silicone additive for extra protection of polished wooden surfaces. Supplied in tins.

Contents	13½ oz 380 g	7 lb 3 kg	
Each	**£0·30**	**1·70**	c

CLEANING BRUSHES see BU-430 et seq.
ULTRASONIC CLEANING see UL-150 et seq.
WASHING and DRYING EQUIPMENT see WD-020 et seq.

All items on this page normally available from stock.

CLIPS

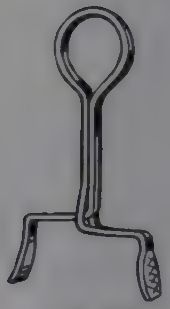
CP-220

CLIPS, Mohr, nickel plated brass, for burettes, tubing, etc. In packs of six.

No.	1	2	3	4	
Length	5	6	7	8 cm	
10 packs	£4·20	4·90	7·00	8·80	c
Pack	£0·47	0·54	0·78	0·98	

CP-230

CLIP, open sided, nickel plated brass screw clip with broad pressure pad for use on tubing up to 12 mm dia. In pack of six ... 10 packs £6·40 Pack £0·70 c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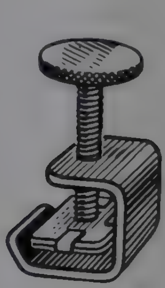
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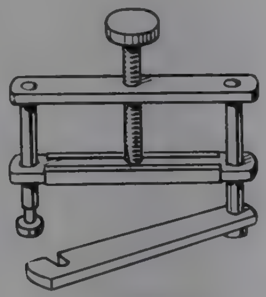
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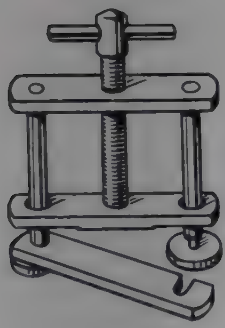
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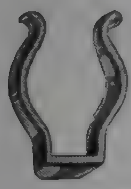
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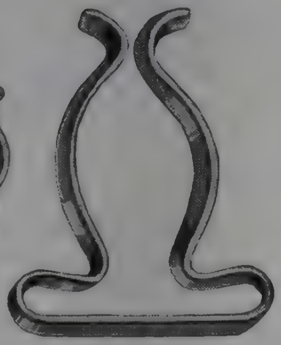
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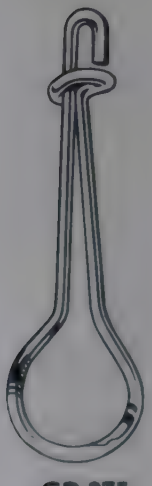
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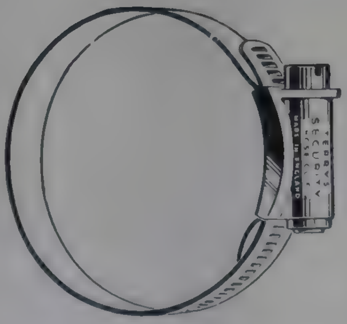
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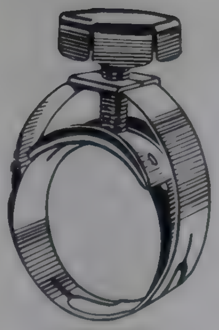

CP-285

CLOCKS, stopclocks	see	TIMING APPARATUS
CLOCKS, wall	see	FURNITURE
CLOTH, asbestos	see	ASBESTOS GOODS

CP-240

CLIPS, Hoffman, nickel plated brass, with clamping screw and hinged bottom plate. In packs of six.

No.	1	2	3	4	5	
Distance between bars	15	20	25	32	40 mm	
10 packs	£7·80	8·60	9·00	9·60	14·40	c
Pack	£0·86	0·96	1·00	1·06	1·60	

CP-245

CLIP, Hoffman, extra strong. Distance between bars 32 mm ... ... Ten £7·60 Each £0·84 c

CP-264

CLIPS, open spring, with polythene coating which provides a tough, resilient surface, prevents scratching and resists corrosion. In packs of 10 complete with screws.

CP-266

CLIPS, as CP-264, but **closed spring.** In packs of 10 complete with screws.

Grip diameter nominal		CP-264		CP-266		
mm	in	10 packs	Pack	10 packs	Pack	
		£	£	£	£	
6·35	¼	2·50	0·31	2·50	0·31	*m*
9·5	⅜	2·50	0·31	2·50	0·31	*m*
12·7	½	3·00	0·36	3·00	0·36	*m*
16	⅝	3·00	0·36	3·40	0·40	*m*
19	¾	3·40	0·40	3·80	0·44	*m*
25·4	1	3·40	0·40	3·80	0·44	*m*
32	1¼	4·10	0·46	4·50	0·50	*m*
38	1½	4·30	0·48	6·60	0·74	*m*
51	2	6·20	0·70	8·00	0·90	*m*

CP-275

CLIP, tubing, corrosion resisting steel, for securely fastening rubber and plastics tubing to glass and metal tubulures and taps. The clip is very easy to fit and does not need a tool. It is much quicker to make a temporary connection using this clip than by twisting wire round the joint and it is more easily removed. The clip is a suitable size for condenser water connections and similar applications where the outside diameter of the tubing when stretched over a tubulure is about 10 mm. In pack of 25 ... ... Ten packs £4·80 Pack £0·53 c

CP-282

CLIPS, worm drive to BS 3628, zinc plated steel, with band and deep square milled thread, for securing rubber tubing to water taps, etc.

Maximum dia.	19	25	35	48 mm	
Closing down to	13	19	25	32 mm	
Ten	£0·64	0·70	0·70	0·80	c
Each	£0·14	0·14	0·14	0·15	

CP-285

CLIPS, hose, improved pattern with double stainless steel band totally encircling the tube. Screw parts cadmium plated.

Maximum dia.	14	17	22	25	30 mm	
Closing down to	10	13	18	21	26 mm	
Ten	£2·00	2·00	2·00	2·00	2·00	c
Each	£0·26	0·26	0·26	0·26	0·26	

All items on this page normally available from stock.

PROTECTIVE CLOTHING

APRONS

CP-705

APRON, polythene, expendable, bib-fronted. Intended to be thrown away when contaminated. Size 90 × 65 cm. In pack of 25 ... ... Pack **£2·20** c

CP-715

APRONS, PVC, white, bib-fronted, for protection against most chemicals.

Size	86 × 71 34 × 28	102 × 91 cm 40 × 36 in	
Ten	**£7·00**	**9·00**	m
Each	**£0·78**	**1·00**	

CP-720

APRONS, fabric supported acrylonitrile, bib-fronted for protection against acids, oils and organic solvents.

Size	102 × 91 40 × 36	112 × 91 cm 44 × 36 in	
Ten	**£21·50**	**23·50**	c
Each	**£ 2·40**	**2·60**	

LABORATORY COATS

LABORATORY COATS in white drill, in men's and women's styles, are well made of good quality materials. All seams are lapped and lock-stitched, two side and breast pockets are reinforced and double stitched. Removable buttons with ring fasteners have ample facings to prevent damage to clothing.

CP-740

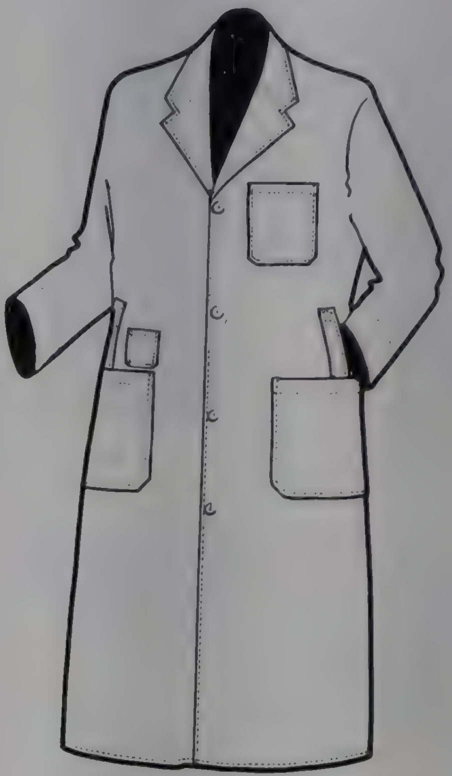
COATS, LABORATORY, white drill, for men, length 46 in.

Chest size	38 96	40 102	42 107	44 in 112 cm	
Each	**£2·70**	**2·70**	**2·70**	**2·70**	m

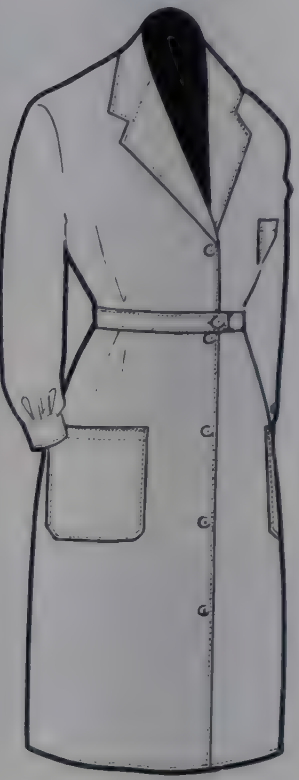
CP-750

COATS, LABORATORY, white drill, for women, belted and with step collar, length 44—46 in.

Bust size	34 86	36 91	38 96	40 in 102 cm	
Each	**£2·35**	**2·55**	**2·55**	**2·55**	m



CP-740



CP-750

GLOVES

CP-770

GLOVES, asbestos, cotton lined, with thumb only. Pair **£1·05** m

CP-775

GLOVES, asbestos, cotton lined, with fingers and thumb ... ... Pair **£1·90** c

CP-780

GLOVES, chrome leather, wrist length. Pair **£0·70** c

•CP-792

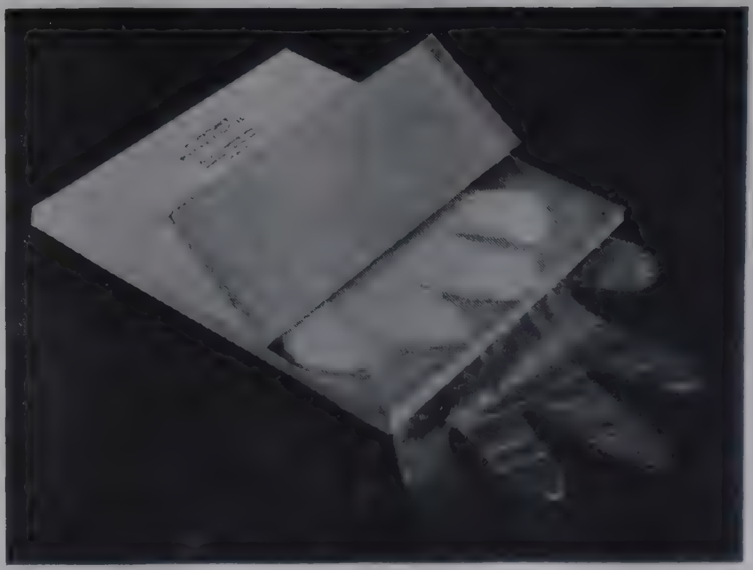
GLOVES, polythene, expendable. These gloves, made from 150 gauge (0·04 mm) transparent polythene, provide an inexpensive hand cover which can be worn once and thrown away if contaminated. Supplied in handy dispensing packs of 100 gloves.

Size	Small	Normal	
Pack	**£0·85**	**0·85**	c

CP-770

CP-775

CP-780



CP-792

All items on this page normally available from stock.

CP-795

CP-808

CP-810

CP-794

GLOVES, latex rubber, surgical type for general protection with extreme sensitivity.

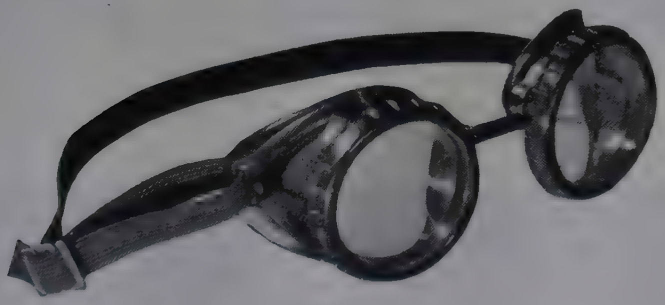
Size	7	8	9	
10 pairs	£2·20	2·20	2·20	c
Pair	£0·28	0·28	0·28	

CP-795

GLOVES, PVC, with cotton interlock lining. For protection against chemicals, oils and greases.

Size	8	9	10	
Pair	£0·55	0·55	0·55	c

MA-955, MA-957 GLOVES, gauntlet, for use in glove or manipulator boxes, see entries in List No. sequence.


CP-835

CP-865

GLOVES

(continued)

HOW TO MEASURE FOR GLOVES

Hold the right hand flat with fingers touching each other and with thumb raised. Measure around widest part of the hand, over knuckles, not including the thumb. Pull tape measure close, but not tight. Number of inches is glove size. For industrial gloves where loose fit is preferred to give 'working room', order 1 or 2 sizes larger than measurement.

CP-806

GLOVES, acrylonitrile, flock lined, light duty with good finger sensitivity. These gloves are resistant not only to the usual range of acids and chemicals, but also to oils, greases and organic vapours which attack normal rubber gloves.

Size	7	8	9	
Pair	£0·40	0·40	0·40	c

CP-808

GLOVES, acrylonitrile, heavy duty. Chemical resistance as CP-806 but **fabric supported** for increased mechanical strength.

Size	8	9	10	
Pair	£1·00	1·00	1·00	c

CP-810

GLOVES, acrylonitrile, heavy duty, as CP-808 but gauntlet type approx. 40 cm long.

Size	8	9	10	
Pair	£1·50	1·50	1·50	c

EYE PROTECTION

CP-835

GOGGLES, lightweight, with well ventilated moulded black nylon cups, adjustable nosebridge and elastic headband. Fitted with 5 cm (2 in) dia. clear laminated safety glasses, protected by cover glasses and retained by nylon rings ... ... Each **£1·20** c

CP-838

GOGGLES, lightweight, as CP-835 but fitted with laminated safety glasses tinted green to Shade 5 of BS 679 instead of plain glasses ... ... Each **£1·40** c

CP-865

EYESHIELD, plastics, a light duty eyeshield the frame of which is fitted with a replaceable, shatter resistant clear acetate window ...: Ten **£4·50** Each **£0·50** m

All items on this page normally available from stock.

EYE PROTECTION

(continued)

CP-870

GOGGLES, full view, flexible plastics with perforated vents and an adjustable elastic headband. **Can be used over corrective spectacles.**
10 pairs **£8·80** Pair **£0·98** *c*

CP-880

FACE SHIELD, with replaceable non-inflammable clear plastics visor, 20 cm deep, fitted to fibre head support by a swivel attachment which allows the visor to be easily raised clear of the face. The soft leather padded head support is attached to an adjustable elastic headband.
Ten **£15·00** Each **£1·70** *c*

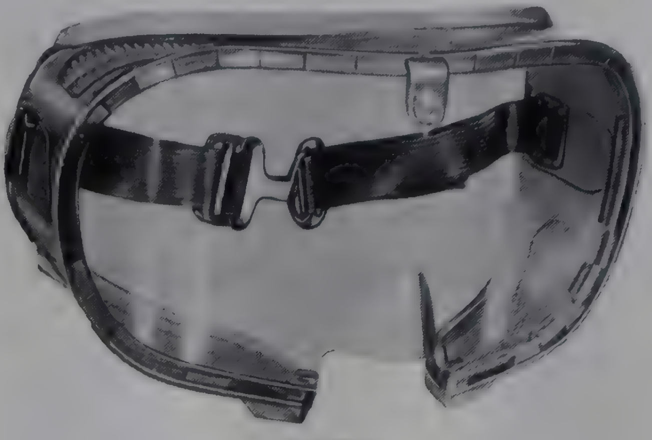
CP-890

LIGHTWEIGHT SAFETY SPECTACLES, with durable black nylon frames and removable ventilated side shields. Fitted with clear, safety toughened glass lenses. Supplied in plastics case.
10 pairs **£13·40** Pair **£1·50** *m*

ACCESSORIES

CP-892 **Lenses, heatsaver,** for protection against excessive infrared and ultraviolet ... ... Pair **£1·25** *m*

CP-894 **Lenses, anti-glare,** *Chance* ON 12 didymium oxide glass for general glassblowing work ... ... Pair **£4·40** *m*


CP-870

CP-380

CP-890

RESPIRATORS

CP-898

FACE MASK, disposable, strong absorbent paper with stitched elastic ear loops. Supplied folded and when in use can be opened out to fit comfortably over the mouth and nose. In pack of 100 ... ... Pack **£1·25** *m*

CP-920

RESPIRATOR, moulded rubber body with 65 mm dia. black anodised aluminium screw retainer and one filter CP-924, or as specified by the customer when ordering. Fitted with two relief valves and an adjustable elastic headband ... ... Ten **£15·00** Each **£1·70** c

ACCESSORIES

CP-922 **Filters,** set of three (one each CP-924, CP-926 and CP-928) in box. 10 sets **£9·80** Set **£1·10** c

CP-924 **Filter, yellow spot,** for protection against low concentrations of toxic dusts.
Ten **£3·30** Each **£0·39** c

CP-926 **Filter, red spot,** for protection against paint vapour and particles ... ... Ten **£3·30** Each **£0·39** c

CP-928 **Filter, green spot,** for protection against low concentrations of organic vapours and acid gases.
Ten **£3·30** Each **£0·39** c

CP-898

CP-920

Gallenkamp
REGD TRADE MARK

COLONY COUNTER

- **Digital display of colony count**
- **Bright, dazzle-free peripheral illumination over light or dark grounds**
- **Contact and marker probes supplied; hand held push switch available**
- **Adjustable full-field magnifier accessory easily mounted on case**

For full details see CX-300 in List No. sequence.

COAL AND COKE TESTING

CB-100 Adiabatic Bomb Calorimeter, *Gallenkamp,* for calorific value determinations to BS 1016.

BH-185 Aluminium Dishes, for moisture determinations.

MU-282 Grinding Mill, for preparation of samples.

SA-600 Riffle Sample Divider to BS 1017.

For details see entries in List No. sequence.

All items on this page normally available from stock.

Gallenkamp COLORIMETER

For Clinical and Biochemical analysis: Blood, urine, body fluids, etc.

Food chemistry: Analysis and quality control. Analytical chemistry: Inorganic and organic analysis.

Agricultural chemistry: Soil analysis. Metallurgy: Iron, steel and non-ferrous metal analysis.

Gallenkamp COLORIMETER

CS-200

- **Transistorised stabiliser circuit**
- **Rapid response—stable readings**
- **Simple to operate and maintain**
- **Optional flowthrough cell**
- **Mirror scale meter—reads optical density direct**
- **Polypropylene 3-position cell holder**
- **Robust unitised construction**
- **Lamp and photocell easily replaced**

CONSTRUCTION

Lamp. The lamp is under-run for long life and over 60% of its light output is utilised. To reduce heating effects to a minimum, a heat filter is interposed between the lamp and the sample. **For replacement purposes processed lamps CS-208 must be used.**

Filters. The *Ilford* colour filters used provide the instrument with adequate reserve sensitivity for blank solutions of optical density up to 0·4.

Cell holder. A 3-position polypropylene sample holder accepts 10 mm rectangular cuvettes, test tubes and the flow through cell. A drain beneath the holder prevents accumulation of spillage.

Photocell and zero control. The epoxy resin encapsulated photocell is readily accessible for replacement purposes. The mechanical zero control ensures brisk meter response at all settings.

Meter. The 11·5 cm scale length meter is fitted with anti-parallax mirror and an antistatic window to avoid pointer errors due to static electricity.

PERFORMANCE

Accuracy. The instrument gives results of an order of accuracy of 1% by direct reading. For higher accuracy it is recommended that a calibration curve be drawn.

Stability. Total drift over long periods is well within 0·005 o.d. units. A 10% variation in mains voltage produces a change in reading of less than 0·005 o.d. units; a ±5 Hz variation in mains frequency produces a change in reading of less than 0·006 o.d. units.

Sample heating. Over a two hour period the sample heats up by only about 5degC.

Flowthrough cell. For multiple, routine testing of similar samples, the flowthrough cell is recommended. With this, up to four tests per minute may comfortably be performed.

DIMENSIONS AND WEIGHT

	H W D
Overall	17 × 21 × 35 cm
Weight, net	7·3 kg

NOTE: Instrument can be supplied for battery operation. Prices on request.

Gallenkamp COLORIMETER

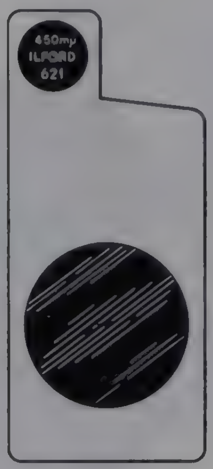
CS-200

COLORIMETER, PHOTOELECTRIC, *Gallenkamp,* as specification, with dust cover but **without** colour filters or test cells. For 100/130V and 200/250V 50/60 Hz single phase supplies ... ... Each **£79·00** *b*

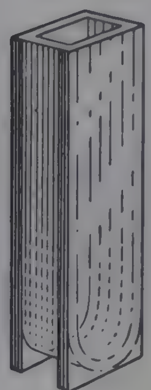
CS-205

COLORIMETER OUTFIT, *Gallenkamp,* comprising one CS-200 colorimeter, one each colour filters CS-212, CS-215 and CS-218, and three test cells CS-250. Each **£87·75** *b*

When ordering please state voltage and frequency of supply.



CS-211 to CS-218



CS-250

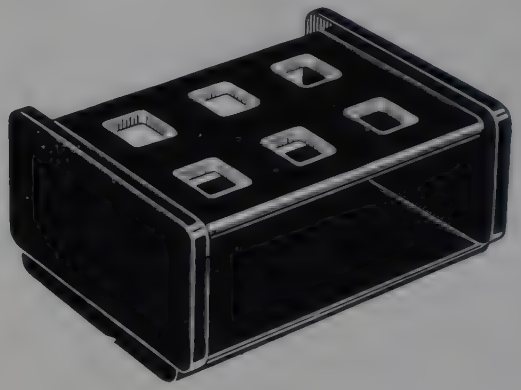
REPLACEMENT PARTS

CS-208	**Lamp,** 6V, 1A, prefocus, specially processed.	Each	**£0·80**	*b*
CS-209	**Photocell**	Each	**£2·30**	*m*

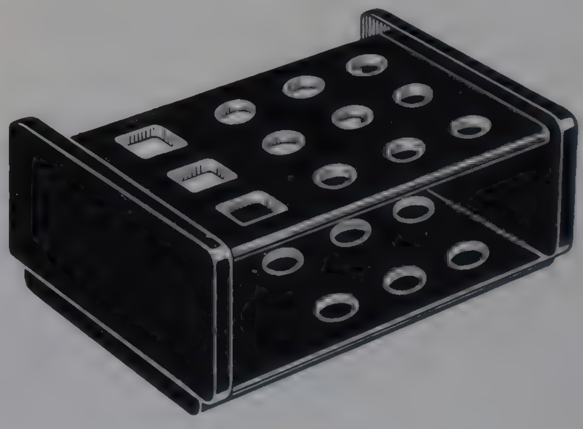
When ordering replacement parts please state serial number of colorimeter and supply voltage.

ACCESSORIES

List No.	Filter colour	*Ilford* No.	Peak trans-mission mμ	Each	
				£	
CS-211	Violet	621	450	**1·65**	*m*
CS-212	Blue	622	470	**1·65**	*m*
CS-213	Blue-Green	623	490	**1·65**	*m*
CS-214	Green	624	520	**1·65**	*m*
CS-215	Yellow-Green	625	540	**1·65**	*m*
CS-216	Yellow	626	570	**1·65**	*m*
CS-217	Orange	607	600	**1·65**	*m*
CS-218	Red	608	670	**1·65**	*m*

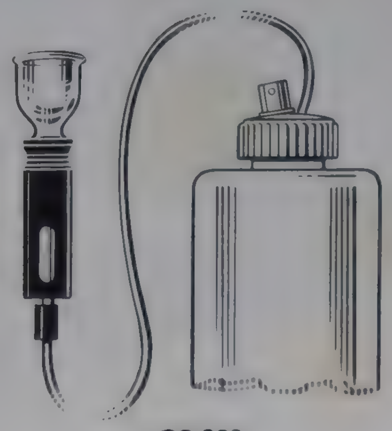


CS-255



CS-280

CS-230	**Filter,** *Chance* **HAI,** heat absorbing glass, in plastics mount. Recommended for use with filters which are heat sensitive and especially with filter CS-218 to reduce the infrared light incident on the photocell.	Each	**£1·70**	*b*
CS-240	**Filter,** *Keeler,* neutral density. Optical density of approximately 0·48 with filter CS-215. Approximately equivalent to 10 mm of a 1 in 201 dilution of blood of 14·6 g Hb% W/V	Each	**£7·50**	*m*
CS-250	**Test cell,** fused glass, 10 mm optical depth, capacity 6 ml.	Each	**£1·30**	*b*
CS-252	**Test cells, matched set** of three cells CS-250.	Set	**£4·10**	*b*
CS-255	**Rack,** bakelite, to hold 6 test cells CS-250.	Each	**£2·75**	*b*
CS-260	**Adapter, test tube,** to hold tubes CS-270 in colorimeter CS-200	Each	**£0·55**	*b*
CS-265	**Adapters, test tube,** as CS-260 but matched set of three, numbered and marked	Set	**£2·00**	*b*
CS-270	**Test tube,** 10 mm internal diameter, 75 mm long, selected for uniform internal diameter ...	Pack of 10	**£0·45**	*c*
CS-275	**Test tubes,** set of twelve tubes, CS-270 marked at uniform transmission point	Set	**£1·45**	*m*
CS-280	**Rack,** plastics, to hold nine test tubes CS-270 and three adapters CS-260	Each	**£3·50**	*b*
CS-282	**Flowthrough cell,** as specification, comprising cylindrical glass cell in holder, plastics connecting tubing and squeeze bottle for emptying	Each	**£3·00**	*b*
CS-283	**Flowthrough cell,** in holder only ...	Each	**£1·75**	*b*



CS-283

All items on this page normally available from stock.

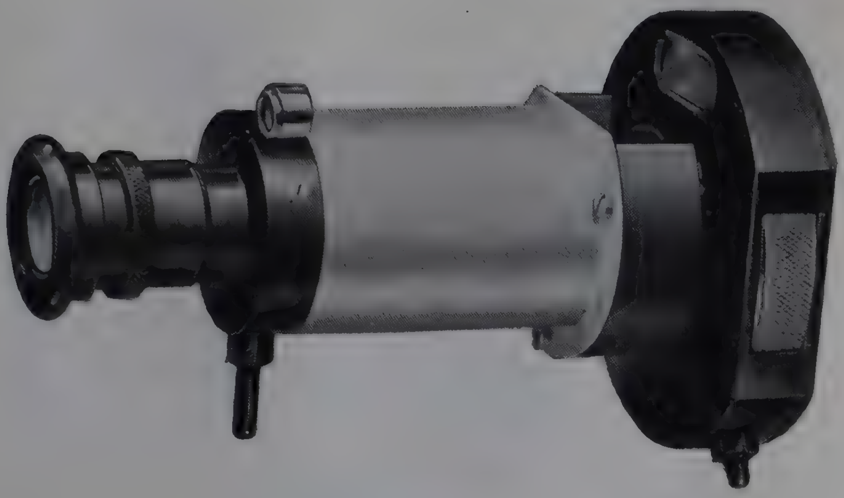
PHOTOMETER

MRC GREY WEDGE PHOTOMETER

Although primarily designed to measure the haemoglobin content of blood, this instrument may be used to measure many other constituents of blood, urine and CSF.

PRINCIPLE

The optical density of a coloured liquid is compared with a standard grey wedge by elimination of colour differences with a colour filter. A double light path is viewed on a screen and the two halves, one sample and one reference, are brought to coincidence of brightness. This is achieved by adjusting the position of the annular wedge which in turn alters the amount of light in the reference beam. Readings are taken on the scale graduated directly in percentage Haldane, with ready conversion to optical density and g/ml haemoglobin. Simple calculation enables such readings to be converted when measuring factors other than haemoglobin.



CS-320

CS-320

PHOTOMETER, GREY WEDGE, MRC, for daylight viewing as specification, with two optical cells, three mounted colour filters, a neutral standard for checking accuracy and reagents. In fitted case with lighting attachment for 110 or 230V 50 Hz supplies ... Each **£60·00** *f*

When ordering please state voltage and frequency of supply.

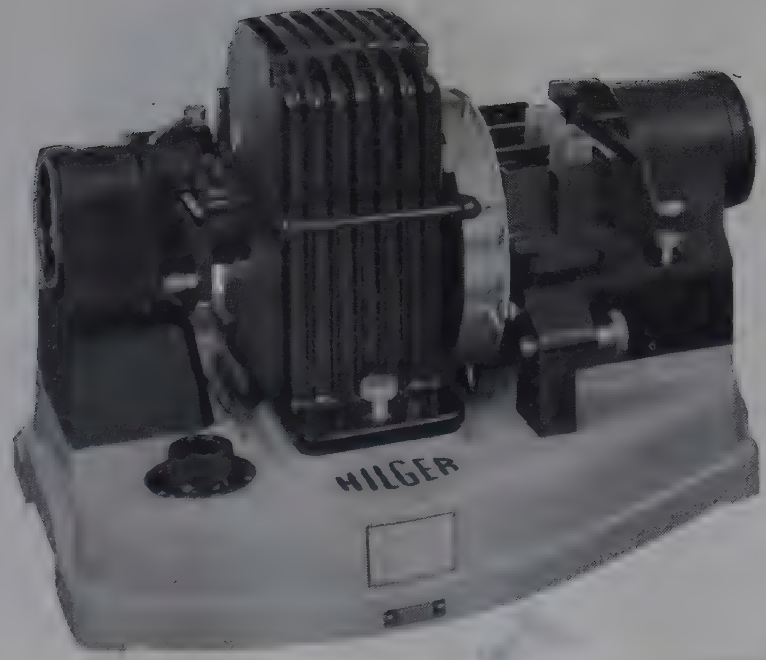
ACCESSORY

CS-322 **Optical cells** ... ... Each **£1·45** *f*

SPEKKER ABSORPTIOMETER

A versatile instrument having a central light source and two photocells. Filters are used to isolate fairly narrow bands of the spectrum. The sample is placed in one light path and a shutter in the other can be adjusted until the photocell outputs are balanced as indicated by a spot galvanometer. Optical density from 0 to 1·3 is read on a 40 cm scale.

With the pair of neutral filters the Spekker may also be used for turbidimetry.



CS-330 without galvanometer

CS-330

ABSORPTIOMETER, Spekker, *Hilger & Watts*, with one set of Kodak spectrum filters in case, one pair of neutral filters, two each 0·5 cm, 1 cm and 4 cm test cells, one spare lamp, and spot galvanometer, for single phase a.c. supplies only ... ... Price U.K. only Each **£227·10** *fN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

CS-334	**Test cells.**					
	Light path	0·5	1	4 cm		
	Each	all **£3·00**				*m*
CS-336	**Lamp**				Each **£2·10**	*m*
CS-338	**Lamp,** mercury vapour				Each **£6·40**	*fN*

Details of other accessories and replacement parts will be sent on request.

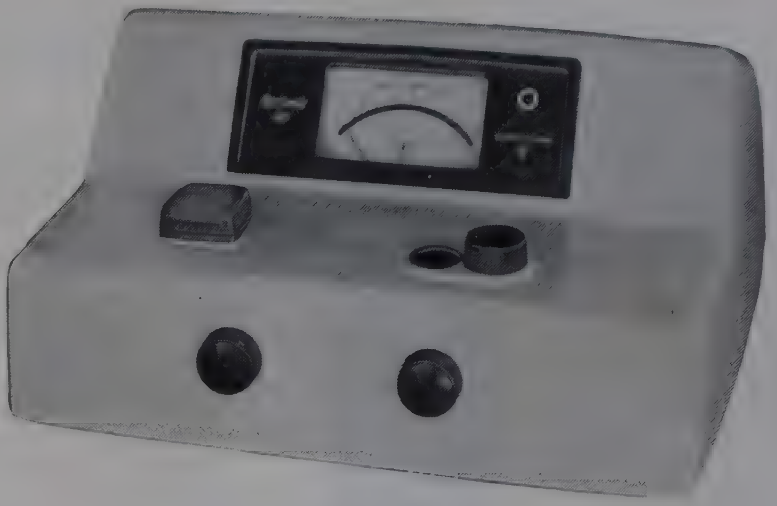
Items on this page normally available from stock except those coded ***N*****.**

SPECTRONIC 20 COLORIMETER-SPECTROPHOTOMETER

The Spectronic 20 Colorimeter-Spectrophotometer employs a *Bausch and Lomb* 'Certified-Precision' diffraction grating, giving a constant band-pass of 20 mμ over the range 340 to 950 mμ. Any section of this range can be selected with a calibrated dial; work in the near infra-red region of 650–950 mμ requires insertion of red sensitive photocell and the red filter. The photocell and the lamp may be changed without recalibration.

Samples are inserted in selected test tubes or cuvettes, and an automatic shutter, operated by removal of the sample, protects the phototube and provides continual zero checks. The zero and 100% transmittance adjustments are readily made by two separate controls, and transmittance or absorbance can then be read directly on a mirrored scale.

For colorimetric work the instrument provides direct reading of optical density at any desired wavelength, and the narrow band-pass made possible by the diffraction grating enables Beer's law to be obeyed almost as exactly as for absolute monochromatic light. The instrument can also be employed as a spectrophotometer, so that absorbance curves can be plotted over the entire range.



CS-360

***CS-360**
COLORIMETER-SPECTROPHOTOMETER, SPECTRONIC 20, range 340 to 650 mμ, supplied with twelve 11·6 mm internal diameter selected test tubes and test tube adapter, directions for use and a plastic dust cover. Complete with transformer for 200/240V 50/60 Hz supplies ... ... Price U.K. only Each **£282·25** *f*

ACCESSORIES

*CS-362	**Red-sensitive photocell** ...	for work in 650–950 mμ region	Each	£4·10	*f*
*CS-364	**Red filter** ...		Each	£1·35	*f*
*CS-366	**Test tubes,** selected, 11·6 mm ...		Pack of 12	£4·75	*f*
*CS-368	**Cuvettes**		Pair	£10·20	*f*
*CS-373	**Clinical methods manual** with 35 methods.		Each	£10·30	*f*
*CS-376	**Industrial methods manual** with methods for aluminium, steel, copper and gold alloys.		Each	£24·35	*f*
*CS-378	**Colour analyser** attachment		Each	£256·25	*f*

REPLACEMENT PART

*CS-380	**Spare lamp**	Each	£1·50	*f*

NESSLER CYLINDERS

CS-450
CYLINDERS, Nessler, *Technico,* to BS 612, with mark at 50 cm³. Lead free glass, with polished bottoms. Supplied in pack of six with marks all one height ±1 mm. Pack **£2·55** *aS*

CS-455
CYLINDERS, Nessler, *Technico,* as CS-450 but with marks at 50 and 100 cm³. Supplied in pack of six with height of corresponding marks ±1 mm. Pack **£3·20** *aS*

TECHNICO
B
BS612
cm³
IN 20°C
50

CS-450

TECHNICO
B
BS612
cm³
IN 20°C
100
50

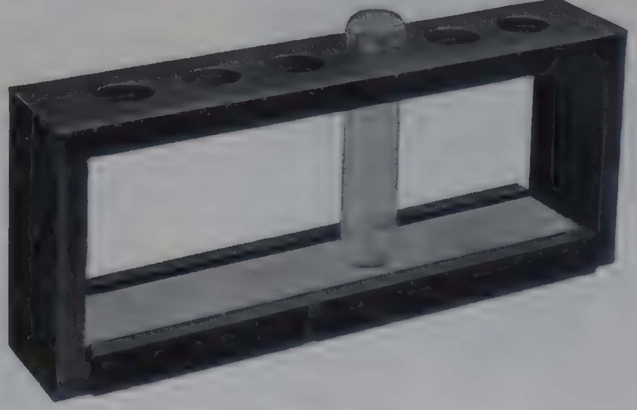
CS-455

CS-470
CYLINDERS, Nessler, *Emil,* to BS 612, made from tubing with shadowless base. One mark at 50 cm³, in pairs matched ±1 mm. 12 pairs **£5·90** Pair **£0·55** *mS*

CS-472
CYLINDERS, Nessler, *Emil,* as CS-470 but with 2 marks at 50 and 100 cm³, in pairs matched ±1 mm.
12 pairs **£7·10** Pair **£0·66** *mS*

CS-480
STAND, for six 50 cm³ **Nessler** cylinders, black painted hardwood, with opal glass base ... ... Each **£1·40** *cS*

CS-485
STAND, as CS-480 but to take six 100 cm³ **Nessler** cylinders ... ... Each **£1·50** *cS*



CS-480

Items on this page coded *S* normally available from stock.

LOVIBOND COLORIMETRIC ANALYSERS

The Lovibond system of colorimetric analysis has earned a worldwide reputation by providing simple test methods which are—
Fast—Accurate—Convenient—
and which employ easy-to-use, rugged apparatus.

The principle is simple; samples are prepared by clearly described proven methods and are compared visually with accurately coloured glass standards. Standards are available for many tests in the fields of chemistry, chemical pathology, quality grading and public health control among which are the following examples.

CHEMISTRY

Aluminium
Ammonia
Bromine and bromide
Chlorine and chloride
Chromium
Cobalt
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Nickel
Nitrate
Nitrite
Oxygen
Phosphate
Silica
Silver
Sodium
Sulphate
Sulphite
Tin
Titanium
Amines
Carbohydrates
Chlorinated hydrocarbons
Pesticides
Detergents
Nicotine
Organic acids
Phenols
Pyridine
Sugar
Thiocyanate
Thiophen
and many airborne toxic gases and vapours

CHEMICAL PATHOLOGY AND PUBLIC HEALTH

p-Amino salicyclic acid
Bilirubin
Carboxyhaemoglobin
Cholesterol
Cholinesterase
Haemoglobin
Lead
Mepacrine
Morphine
Nicotinic acid
Phosphate
Protein
Sugar
Sulphonamide
Urea

QUALITY GRADING

Petroleum product colours
Beer colours
Solvent colours
BOD
Butter colours
Vegetable oil colours
FAC scale
Gardner scale
Hazen scale
Relative humidity
Milk product colours
Milk testing
Rubber latex
Sand quality
Sand colour
Varnish colours
Swimming pool and water testing

There are three basic forms of analysers:—

COMPARATOR. Comprises a hinged black plastics case which accommodates a disk containing a number of permanent colour standards and two cells, one for the sample and one for the blank. Each test requires the use of a disk containing standards representing the range of colours produced by different concentrations of the material under test.

NESSLERISER. For analysis by the Nessler method, cylinders are viewed side by side from the top against an inclined white reflector. Matching is achieved by means of a colour filter disk which is complementary to one cylinder.

TINTOMETER. A double beam instrument with built-in light sources and a range of colour filters and controls which enable any colour to be accurately described or matched. The two emergent beams are brought side-by-side to one eyepiece for precise comparison.

LOVIBOND '1000' COMPARATOR

Lovibond "1000"
COMPARATOR

CT-700 with CT-710
and two CT-716

CT-700 with CT-710 and CT-714

When fitted with accessories the comparator provides a versatile system for visual colorimetric analysis capable of:—

- **Measurements with cells up to 40 mm lightpath**
- **Measurements on dilute solutions using special Nessler cylinders up to 250 mm sample depth**

CT-700

COMPARATOR, Lovibond '1000', a robust, portable plastics case which accepts two tubes or cells up to 13·5 mm light path and one disk containing permanent colour standards. The disk is revolved by hand and a click-stop locates each colour standard in the viewing aperture. **Without tubes, cells or disk** ... ... Each **£4·50** *m*

CT-710

PRISM ATTACHMENT, which brings the sample and colour standard fields of view together for easier and more accurate comparison. Clips on the front of comparator CT-700 ... ... Each **£4·00** *m*

CT-714

LARGE CELL ATTACHMENT. Slots into the back of comparator CT-700 and allows comparisons to be made on tubes or cells from 15 to 40 mm optical depth. Each **£0·80** *m*

ACCESSORIES

CT-716 **Cells, glass, precision square.**

Light path	13·5	25	40 mm	
Pair	£0·70	1·40	2·00	*m*

All items on this page normally available from stock.

LOVIBOND '1000' COMPARATOR

ACCESSORIES

CT-740

NESSLER ATTACHMENT, for examining dilute solutions of pale colour. The hinged metal case accepts two Lovibond Nessler cylinders up to 250 mm sample depth, and the comparator CT-700 slots on to the top. Overall dimensions without comparator 9·5×10·5×37 cm high. **Requires but does not include comparator CT-700, Nessler cylinders and Nessleriser disk.**

Each **£8·00** *m*

CT-742	**Nessler cylinders,** 250 mm sample depth. Pair **£2·50** *m*	
CT-844	**Nessler cylinders,** 113 mm sample depth. For details and price see entry in List No. sequence.	

For suitable Nessler disks see CT-850 to CT-859 in List No. sequence.

CT-740 with CT-700 and CT-710

CT-780

WHITE LIGHT CABINET, bench mounting, providing a source of simulated Illuminant C artificial daylight. Ensures complete standardisation of viewing conditions essential for high precision colour comparisons. Accepts comparator CT-700 and Nessler attachment CT-740. With daylight correction blue glass filter and On/Off switch. Overall dimensions 29×18×14 cm high. For 220/240V a.c. single phase supplies ... Each **£11·50** *mN*

CT-782 **Legs** for CT-780. Allow the cabinet to be positioned at any convenient viewing angle ... ... Pair **£1·75** *m*

CT-780 with CT-782, CT-700 and CT-710

CT-790

COLORIMETRIC CHEMICAL ANALYTICAL METHODS, a set of three volumes containing over 300 tests methods covering organic and inorganic chemical analysis, biochemistry, pharmacology, toxic substances in air, colour grading and quality testing ... Set **£6·00** *mN*

DISKS FOR COMPARATOR CT-700

Note: pH disks include 25 ml dropping bottle of indicator.

List No.	Code	Test	Range	Subdivision	Method	Each	
						£	
CT-810	2/1 A	pH	1·2–2·8	0·2 pH	Thymol blue	**5·00**	*m*
CT-812	2/1 B	pH	2·8–4·4	,,	Bromophenol blue	**5·00**	*m*
CT-814	2/1 E	pH	4·4–6·0	,,	Methyl red	**5·00**	*m*
CT-816	2/1 H	pH	6·0–7·6	,,	Bromothymol blue	**5·00**	*m*
CT-818	2/1 J	pH	6·8–8·4	,,	Phenol red	**5·00**	*m*
CT-821	2/1 L	pH	8·0–9·6	,,	Thymol blue	**5·00**	*m*
CT-824	3/2 AB	Chlorine in water	0·15–2·0 ppm	—	Acid o-tolidine	**4·50**	*m*
CT-826	3/12	Phosphate in boiler water	0–80 ppm	—	Hydroquinone	**4·50**	*m*

Items on this page normally available from stock except those coded *N.*

BDH LOVIBOND NESSLERISER

CT-840

CT-840

NESSLERISER, *BDH* **Lovibond,** for colorimetric tests. This instrument permits the analysis of dilute solutions by the use of greater depths of liquids. The moulded body holds the disk, containing nine permanent colour standards, which revolves in a compartment above two Nessler cylinders, one containing the test solution and the other a compensating 'blank'. Complete with two Nessler cylinders but without disk ... ... Each **£9·30** *m*

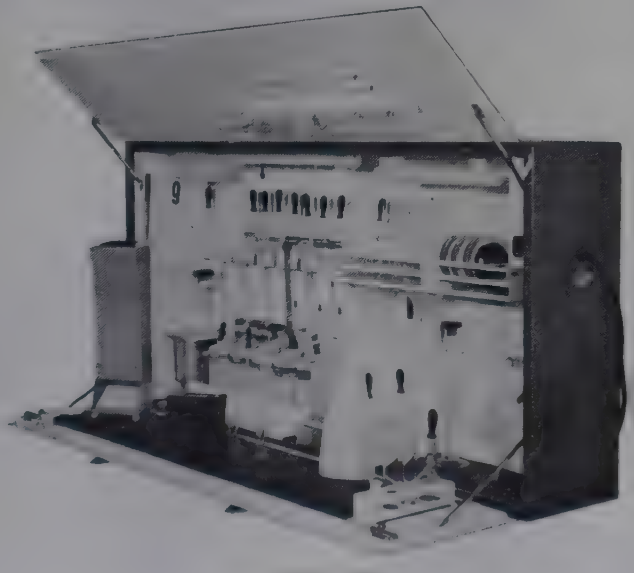
REPLACEMENT PARTS AND ACCESSORIES

CT-844	**Nessler cylinders,** 113 mm sample depth	Pair	**£0·80**	*m*
CT-846	**Nessler cylinder,** modified for oxygen in boiler water by indigo carmine method.	Each	**£1·25**	*m*

DISKS

List No.	Code	Test	Range	Method	Each	
					£	
CT-850	NLF	pH	8·0–9·6	Thymol blue	**5·00**	*m*
CT-852	NAA	Ammonia	1–10 µg	Nessler's reagent	**4·50**	*m*
CT-854	NAB	,,	10–26 µg	,,	**4·50**	*m*
CT-856	NAC	,,	28–60 µg	,,	**4·50**	*m*
CT-858	NOE	Oxygen in boiler water	0–0·12 ml/l	Indigo-carmine	**4·50**	*m*
CT-859	NOH	Hydrazine in boiler water	0–10 µg	—	**4·50**	*m*

For details of comparator CT-700 and Nessler attachment CT-740 see entries in List No. sequence.



WR-480

NALFLOC
WATER TESTING MINILABS
using BDH-LOVIBOND NESSLERISER

WR-260	**Model O_2Z,** for determination of oxygen in feed water.
WR-265	**Model P,** for determination of phosphate.
WR-480	**Model W,** a complete testing laboratory.

For full details see entries in List No. sequence.

All items on this page normally available from stock.

LOVIBOND TINTOMETERS

Lovibond Tintometers provide a reliable and straightforward means of specifying the colours of liquid samples in standard cells or of solid samples. All models have colour filters built-in to enable a colour to be assembled until it matches the colour of the sample. Matching is done visually because no satisfactory physical substitute has been found for so accurately judging the subjective property of colour. Stating the filters required to match the sample specifies the sample colour.

Four standard Tintometers are offered, two with provision for internal sample examination and two with flexible optics and test heads for external sample evaluation. The latter are useful where the samples under test cannot be placed within the instrument. One Tintometer of each kind is lower priced and has a reduced range of filters compared with the other.

Special purpose Tintometers are available—full details can be sent on receipt of information about the test to be performed.

CT-870

CT-870

TINTOMETER, Standard Model AF 700, for general laboratory and works use on liquids or solids of light to medium colour. Complete with 10 mm and 1 in cells, 60 colour filters and 12 neutral tints, white light cabinet and box containing cleaning, setting-up and maintenance accessories and tools. For 200/240V a.c. supplies.
Each **£176·00** *m*

CT-872

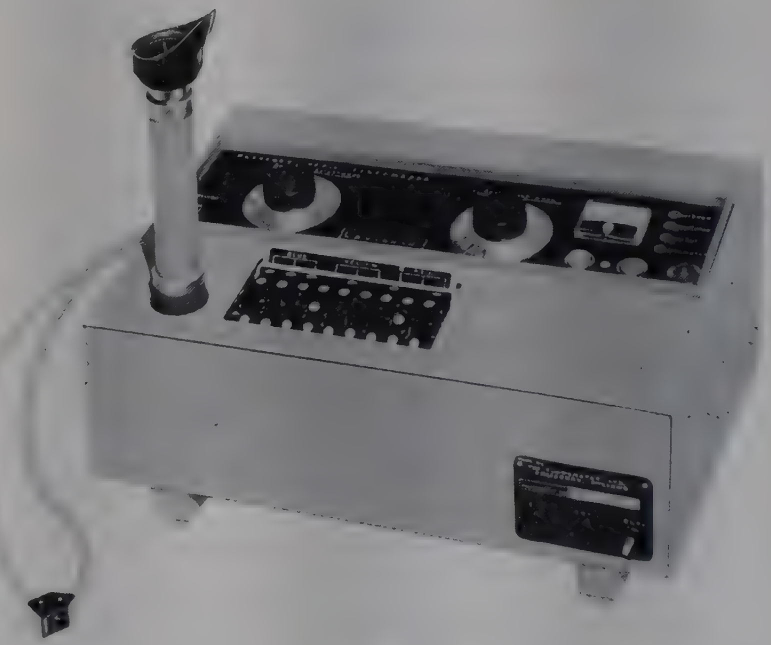
TINTOMETER, Universal Model AF 702, as CT-870 but with 12 extra colour filters to extend range to deeper colours, e.g. paints, inks, cosmetics, etc. Each **£214·00** *m*

REPLACEMENT PART

CT-874 **White light cabinet,** complete with two lamps, two magnetic chucks, two magnesium carbonate blocks, porcelain tray, presser and frame for powders, book of analysis forms and separate accessories box.
Each **£37·00** *m*

CT-880

TINTOMETER, Flexible optics Model AF 750, for work on very large or small samples or samples which must be examined under controlled environmental conditions. With 405 mm optical leads, standard surface viewing head, 54 colour filters and box containing cleaning, setting-up and maintenance accessories and tools. For 200/240V a.c. supplies ... ... Each **£280·00** *m*



CT-880

CT-882

TINTOMETER, Flexible optics Model AF 751, as CT-880 but with extended range of 73 colour filters, liquid viewing (cell holder) head, 10 and 40 mm cells and spare lamp. For 220/240V a.c. supplies. Each **£370·00** *m*

CELLS FOR TINTOMETERS CT-870 TO CT-882

CT-886

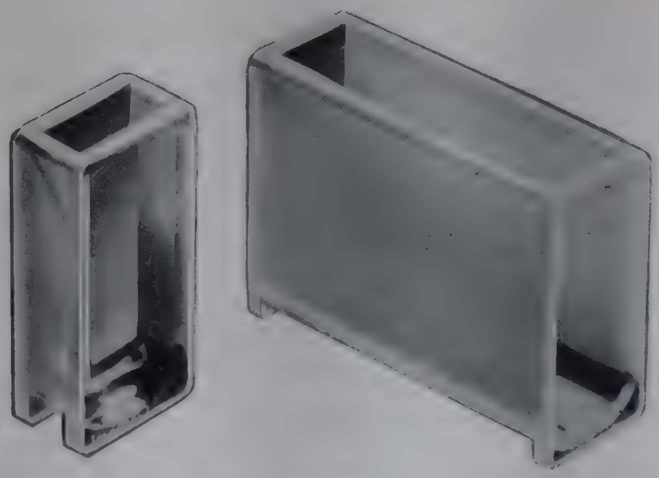
CELLS, fused glass, for liquid samples.

Light path	6	5¼	1 in	
Each	**£2·80**	**2·80**	**1·40**	*mS*

CT-888

CELLS, fused glass, for liquid samples.

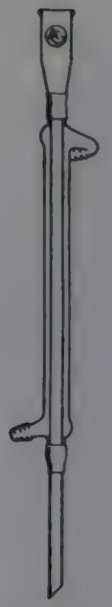
Light path	40	25	10	5 mm	
Each	**£2·00**	**1·40**	**1·40**	**1·40**	*mS*



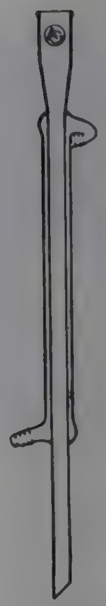
CT-886
CT-888

Items on this page coded *S* normally available from stock.

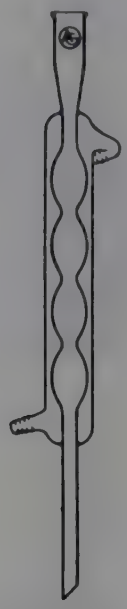
CONDENSERS



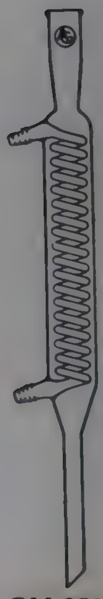
CU-320



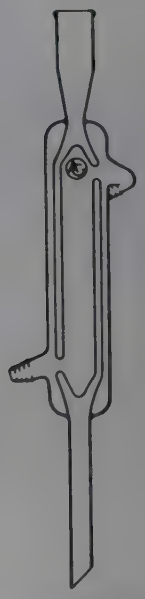
CU-330



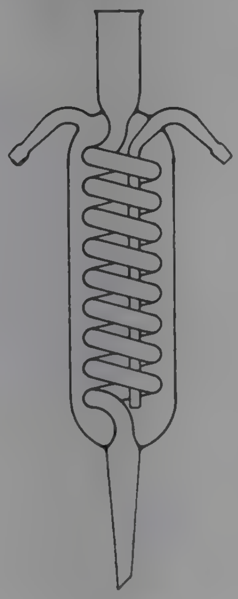
CU-340



CU-350



CU-360



CU-380

DISTILLATION COLUMNS	see	DISTILLATION
DISTILLATION FLASKS	see	FLASKS
DISTILLATION RECEIVERS	see	CYLINDERS
STILLHEADS	see	DISTILLATION

CONDUCTIVITY BRIDGES see ELECTROCHEMICAL ANALYSIS
CONE JOINTS see JOINTS
CONNECTORS, electrical see ELECTRICAL APPARATUS
CONNECTORS, tubing see TUBING CONNECTORS

CU-320

CONDENSERS, (AG) Liebig, efficient narrow jacket with rubber connections, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	19–20	19–20 mm	
Ten	£6·40	7·00	a
Each	£0·72	0·78	

MW-098
CONDENSER, Liebig reflux.

NR-210
CONDENSER, Kjeldahl.

WJ-130
CONDENSER, Dean & Stark, to BS 756.

For prices see entries in List No. sequence.

CU-330

CONDENSERS, (AG) Liebig, borosilicate glass, with narrow fused-on jacket, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	19–20	19–20 mm	
Ten	£8·80	9·20	a
Each	£0·98	1·02	

CU-340

CONDENSERS, (AG) Allihn, borosilicate glass, fused-on jacket, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	35–37	35–37 mm	
Ten	£12·60	16·00	a
Each	£ 1·40	1·80	

CU-350

CONDENSERS, (AG) Graham, borosilicate glass, with fused-in cooling spiral, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	35–37	35–37 mm	
Ten	£15·50	21·00	a
Each	£ 1·75	2·35	

CU-360

CONDENSERS, (AG) Davies double-surface pattern, borosilicate glass. Recognised for more than 50 years as the most efficient glass condenser available at a modest price, and adopted for standardisation in BS 1848.

Length of jacket	15	20	30 cm	
Approx. condensing surface	200	300	450 cm²	
Dia. of jacket	41–43	41–43	41–43 mm	
Ten	£15·00	17·00	19·00	a
Each	£ 1·70	1·90	2·15	

CU-380

CONDENSER, (AG) Thorpe, Inland Revenue pattern, **borosilicate glass,** to BS 1848. Length of jacket 20 cm, dia. 63–67 mm ... ... Ten **£28·00** Each **£3·10** a

CONDENSERS, standard distillation—see PE-790 to PE-795 in List No. sequence.

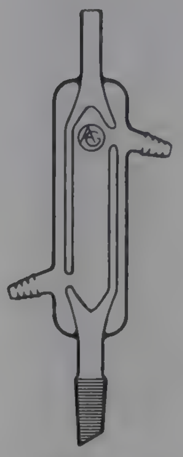
All items on this page normally available from stock.

CONDENSERS

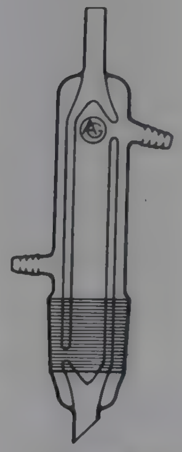
Regd.

DAVIES DOUBLE-SURFACE CONDENSERS

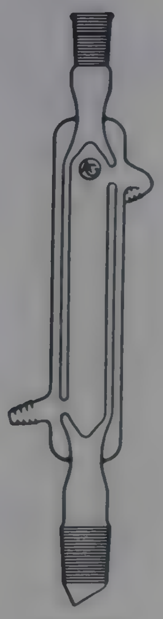
All *Gallenkamp* manufactured Davies condensers have a gradual taper at the lower end of the inner tube so that the condenser can be used in an inclined position without any liquid trap occurring at the shoulder.



CU-520



CU-530



CU-550

CU-520

CONDENSERS, Ⓐ **Davies double surface, borosilicate glass,** for reflux use, with cone joint.

Length of jacket	15	20 cm	
Cone	29/32	29/32	
Ten	**£19·00**	**20·50**	*a*
Each	**£ 2·15**	**2·30**	

CU-530

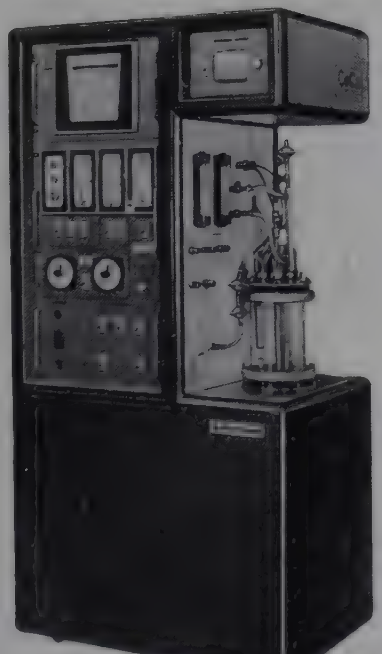
CONDENSERS, Ⓐ **Davies double surface, borosilicate glass,** for reflux use, with cone joint. These condensers on the larger size of standard joint are a very compact design in which the cone joint forms the lower portion of the outer jacket. Length of jacket 20 cm.

Cone	40/38	50/42	
Ten	**£23·00**	**28·00**	*a*
Each	**£ 2·55**	**3·10**	

CU-550

CONDENSERS, Ⓐ **Davies double surface, borosilicate glass,** with cone and socket joint. Socket 19/26. Length of jacket 20 cm.

Cone	19/26	24/29	
Ten	**£21·00**	**23·00**	*a*
Each	**£ 2·35**	**2·55**	



For continuous culture of micro-organisms

Gallenkamp CeCa

REGD. TRADE MARK

CONTROLLED ENVIRONMENT CULTURE APPARATUS

By providing close control over chemical and physical conditions, CeCa creates a stable environment for long term continuous growth of bacteria, fungi, algae, protozoa, viruses and cultured plant and animal cells.

- **Vaccines**
- **Antibiotics**
- **Enzymes**
- **Dairy fermentations**
- **Brewing**
- **Sewage**
- **Effluents**

See CX-650 in List No. sequence.

All items on this page normally available from stock.

***CV-010**

CORKS, best quality, tapered, cut with the grain. For general chemical use. Dimensions are approximate. Supplied in cartons of uniform size for convenient storage. Carton contents listed against each size are approximate.

10 cartons **£6·60** Carton **£0·75** c

Small end	6	8	9	11	12	14 mm
Large end	9	11	12	14	15	17 mm
Length	16	18	23	23	27	27 mm
Contents, approx.	440	380	320	280	225	190

Small end	15	17	18	20	21 mm
Large end	18	20	21	23	24 mm
Length	27	27	32	32	32 mm
Contents, approx.	150	110	80	70	65

Small end	23	24	26	28	30	32 mm
Large end	26	27	29	31	33	35 mm
Length	32	32	32	32	32	32 mm
Contents, approx.	50	45	40	38	35	30

Small end	35	38	41	44	47 mm
Large end	38	41	44	47	50 mm
Length	32	32	32	32	32 mm
Contents, approx.	25	20	15	12	11

***CV-015**

CORKS, as above, in packs of 120 assorted.

Pack	A	B	
Size range	6 to 26	12 to 38 mm	
10 each small end	6 to 20	12 to 24 mm	
5 each small end	21 to 26	26 to 38 mm	
10 packs	**£7·80**	**13·00**	c
Pack	**£0·88**	**1·45**	

CV-050

CORK SHEETS, COMPRESSED, 30 × 15 cm.

Thickness	3	6	13 mm	
10 sheets	**£0·40**	**0·70**	**1·45**	c
Sheet	**£0·13**	**0·14**	**0·21**	

STOPPERS

SU-520	Borosilicate glass	**SU-780**	Neoprene
SU-700 **SU-710** **SU-712**	Polypropylene	**SU-800**	Silicone rubber
SU-760 **SU-765**	Natural rubber	**SU-820** **SU-850**	*Suba-seal*

For details see entries in List No. sequence.

CV-070

CV-070

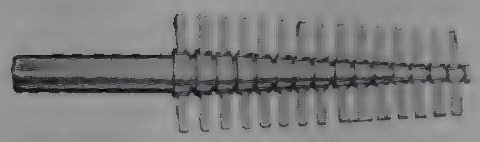
CORK RINGS, COMPRESSED, with mitred edge for supporting flasks, etc.

Dia.-external (approx.)	80	115	155	195	240 mm	
Dia.-internal (approx.)	45	80	115	155	195 mm	
Thickness	45	45	45	45	45 mm	
Ten	**£1·20**	**1·90**	**3·20**	**4·40**	**5·40**	c
Each	**£0·19**	**0·25**	**0·38**	**0·49**	**0·60**	

CV-075

CORK RINGS, COMPRESSED, as CV-070, but in set comprising one of each size ... ... Set **£1·90** c

CORK BORERS



CV-100

CV-100

CORK BORERS, safety pattern. The cutting tubes are hard soldered to the handles which are counter bored for additional safety. Each handle is numbered, No. 1 cutting a hole approximately 3 mm, each successive number being 1·5 mm larger up to No. 16 cutting a hole approximately 27 mm. Nickel plated brass in sets complete with ejector.

Set of	8	12	16 borers	
Size Nos.	1—8	1—12	1—16	
Range approximately	3—14	3—21	3—27 mm	
Set	**£3·90**	**6·75**	**10·00**	c

REPLACEMENT PARTS

CV-101 **Borers, as used in above sets, supplied singly.**

Size Nos.	1, 2, 3, 4, 5	6, 7, 8, 9, 10	11, 12, 13, 14, 15, 16	
Each	£0·60	0·80	1·00	c

CV-102 Ejector, for use with above borers ... Each £0·15 c

All items on this page normally available from stock.

CORK BORERS AND CUTTERS

CV-105

CORK BORERS, economy pattern, plated brass. The collar on each borer has a transverse hole in which the ejector rod is used as a tommy bar. Set of six for cutting holes 4 to 12 mm dia. with ejector.
10 sets £15·50 Set £1·75 *c*

CV-110

CORK BORER SHARPENER, all metal construction for sharpening borers 3–27 mm dia.
Ten £7·40 Each £0·82 *c*

CV-120

CORK BORING MACHINE, for drilling holes from 3 mm to 25 mm dia. in bark, compressed and rubber corks. Complete with set of 15 nickel plated steel borers ... ... Each £19·50 *c*

REPLACEMENT PARTS

CV-121 **Borers,** steel, for above machine. The size number is the approx. dia. in sixteenths of an inch (1·5 mm).

No.	2, 3, 4, 5, 6	7, 8, 9, 10, 11	12, 13, 14, 15, 16	
Each	£0·65	0·75	0·85	*c*

CV-122 **Borers,** set of 15, one of each size ... Set £11·00 *c*

CV-130

CORK PRESS, for compression softening of corks up to 38 mm dia. ... ... Each £2·50 *c*

TT-160

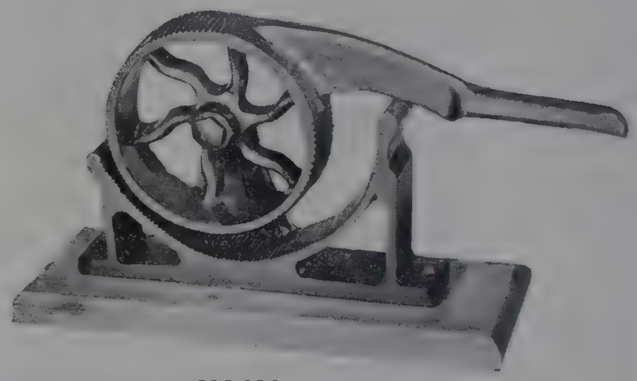
KNIFE, for cutting cork. For details and price see entry in List No. sequence.

COTTON WOOL,
coloured } see CULTURE APPARATUS
white }

CV-105

CV-110

CV-120


CV-130

COUNTERS

CV-800

COUNTER, TALLY, registering to four figures. With thumb lever for manual operation. One complete turn of the reset knob returns all figures to zero.
Each £2·37 *m*

CV-830

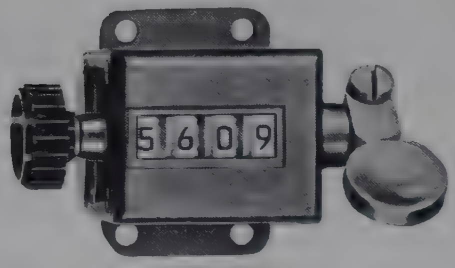
COUNTER, TALLY, registering to four figures with zero reset control. With push button for manual operation, a chain retaining ring for location on the operator's finger and a plastics stand for bench mounting.
Each £2·00 *m*

COUNTER, colony see CX-300

COUNTER, revolution see TB-020

COUNTING CHAMBERS,
haemacytometer see MD-200 et seq.

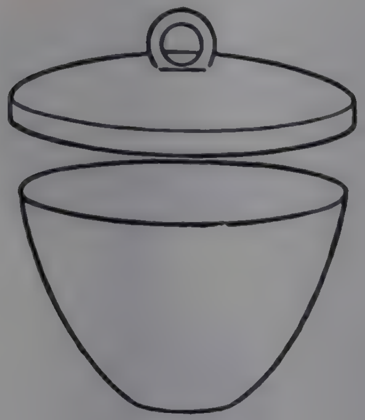
For full details see entries in List No. sequence.



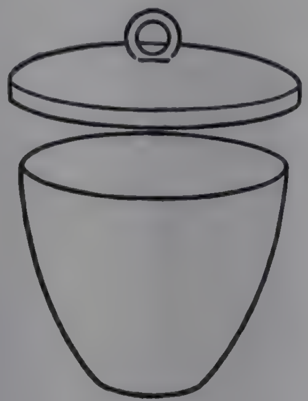
CV-800

CV-830 without stand

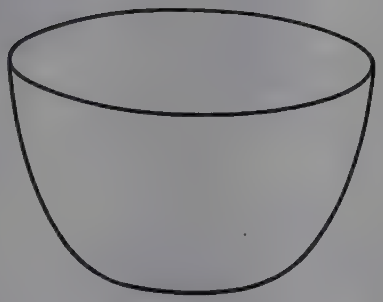
All items on this page normally available from stock.



Form A
CW-210 + CW-212
CW-250 + CW-252



Form B
CW-214 + CW-216



CW-250

CW-210
CRUCIBLES, *Royal Worcester* **porcelain,** squat form A, completely glazed.

CW-212
CRUCIBLE COVERS, for CW-210.

CW-214
CRUCIBLES, *Royal Worcester* **porcelain,** tall form B, completely glazed.

CW-216
CRUCIBLE COVERS, for CW-214.

Form A Size No.	Capacity ml	Dia. mm	CW-210		CW-212		
			Ten	Each	Ten	Each	
			£	£	£	£	
3/0	8	32	0·60	0·13	0·45	0·13	d
2/0	15	40	0·75	0·15	0·45	0·13	d
0	19	43	0·80	0·15	0·55	0·13	d
1	28	49	1·05	0·18	0·65	0·14	d
2	50	59	1·40	0·21	0·75	0·15	d
3	80	70	1·75	0·24	1·00	0·17	d
Form B Size No.			**CW-214**		**CW-216**		
			£	£	£	£	
2/0	11	32	0·60	0·13	0·40	0·13	d
0	16	39	0·80	0·15	0·55	0·13	d
1	32	43	1·35	0·20	0·55	0·13	d

CW-250
CRUCIBLES, *Vitreosil*, translucent, glazed, squat form.

CW-252
CRUCIBLE COVERS, standard pattern, for CW-250.

Capacity ml	Dia. mm	Height mm	CW-250		CW-252		
			Ten	Each	Ten	Each	
			£	£	£	£	
10	41	19	4·10	0·46	4·00	0·45	m
15	41	25	4·90	0·54	4·00	0·45	m
25	47	28	5·40	0·60	4·50	0·50	m
50	57	37	6·20	0·68	5·40	0·60	m
80	67	45	8·80	0·98	6·60	0·74	m
150	82	51	10·60	1·18	7·40	0·82	m

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

CW-280
CRUCIBLES, *Vitreosil*, translucent, glazed, tall shape.

CW-282
CRUCIBLE COVERS, for CW-280.

Capacity ml	Dia. mm	Height mm	CW-280		CW-282		
			Ten	Each	Ten	Each	
			£	£	£	£	
10	27	32	7·15	0·80	3·60	0·42	*m*
20	35	38	7·90	0·88	3·60	0·42	*m*
30	43	38·5	8·00	0·90	3·70	0·43	*m*
50	51·5	51	9·70	1·08	4·00	0·45	*m*
200	73	81	14·15	1·60	6·75	0·76	*m*

CW-300
CRUCIBLES, *Vitreosil*, translucent, glazed, with broad base.

Capacity	15	25	40 ml	
Dia.	41	48	57 mm	
Height	24	27	37 mm	
Ten	£6·00	6·13	8·70	*m*
Each	£0·66	0·68	0·96	

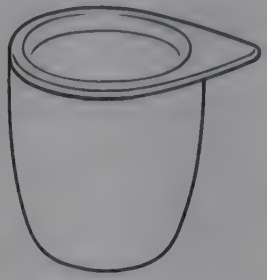
CW-310
CRUCIBLES, *Vitreosil*, translucent, glazed, for gold assay.

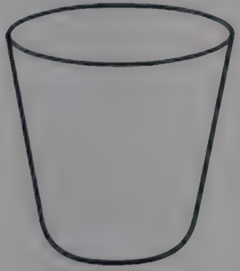
Capacity	10	30 ml	
Dia.	30	42 mm	
Height	30	42 mm	
Ten	£7·15	9·60	*m*
Each	£0·80	1·08	

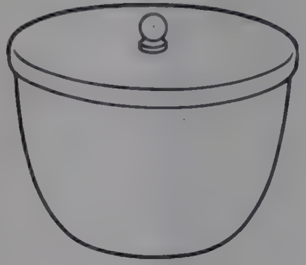
CW-330
CRUCIBLES, nickel, guaranteed 99% pure.

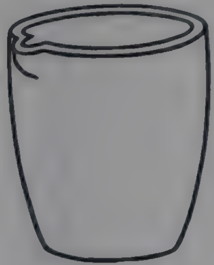
CW-332
CRUCIBLE COVERS, for CW-330.

Capacity ml	Dia. mm	Height mm	CW-330		CW-332		
			Ten	Each	Ten	Each	
			£	£	£	£	
10	25	24	2·05	0·27	0·98	0·17	*m*
15	30	29	2·25	0·29	1·00	0·17	*m*
25	35	34	2·70	0·33	1·30	0·20	*m*
30	40	38	3·10	0·37	1·40	0·21	*m*
70	50	48	4·10	0·46	1·65	0·23	*m*
130	60	58	7·40	0·82	2·40	0·30	*m*


CW-280 with CW-282
CW-330 with CW-332
CW-340


CW-310


CW-360


CW-400

CW-340
CRUCIBLES, platinum, with covers. Quoted weights include cover.

Capacity	10	15	20 ml	
Dia.	26	29	34 mm	
Height	27	32	34 mm	
Approx. wt.	11	16	21 g	
Each	£38·00	52·00	65·00	*fN*
Capacity	25	30	40 ml	
Dia.	35	38	42 mm	
Height	36	39	44 mm	
Approx. wt.	25	30	40 g	
Each	£76·00	90·00	117·00	*fN*
Capacity	50	75	100 ml	
Dia.	47	53	56 mm	
Height	46	53	57 mm	
Approx. wt.	49	67	95 g	
Each	£145·00	200·00	275·00	*fN*

CW-360
CRUCIBLES, sheet iron, with cover.

Capacity	45	200 ml	
Dia.	45	80 mm	
Height	35	60 mm	
Ten	£3·00	5·10	*c*
Each	£0·36	0·57	

CW-400
CRUCIBLES, Salamander plumbago, 'A' shape, with pouring lip.

Capacity	190	320	680 ml	
Top dia.	79	95	114 mm	
Base dia.	56	62	76 mm	
Height	97	109	141 mm	
Each	£0·40	0·60	1·00	*m*

CRUCIBLE ACCESSORIES

TS-212 et seq.	**TONGS**	For details see entries in List No. sequence.
TV-540	**TRIANGLES**	

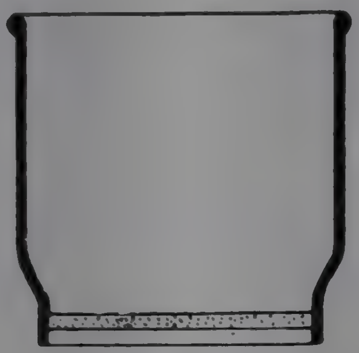
Items on this page normally available from stock except those coded *N.*

SINTAGLASS FILTER CRUCIBLES

Manufactured in our own factory under accurately controlled conditions.

- **Close tolerance porosity ranges**
- **Colour coded for porosity**
- **Non-friable sintered plates**
- **Made from borosilicate glass**
- **Reinforcing rim at top**

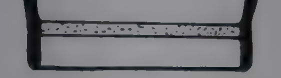
For full details of porosity ranges, colour coding and other useful information see data under page heading Sintered Glassware.



CW-481 to CW-515

CRUCIBLES, *Sintaglass.* A stable crucible with a short skirt below the filter plate. Forms an excellent fit with funnels CW-720 and rings CW-725.

Capacity, approx	8	15	35	70 ml	
Plate diameter	15	20	30	40 mm	
Ht. above plate	35	40	45	50 mm	
Weight, approx	8	15	25	35 g	
Porosity	List Numbers				
1	**CW-481**	**CW-491**	**CW-501**	**CW-511**	
2	**CW-482**	**CW-492**	**CW-502**	**CW-512**	
3	**CW-483**	**CW-493**	**CW-503**	**CW-513**	
4	**CW-484**	**CW-494**	**CW-504**	**CW-514**	
Ten	**£3·10**	**3·20**	**3·60**	**3·90**	a
Each	**£0·37**	**0·38**	**0·42**	**0·45**	
Porosity					
5	**CW-485**	**CW-495**	**CW-505**	**CW-515**	
Ten	**£8·80**	**10·40**	**10·80**	**13·00**	a
Each	**£0·98**	**1·16**	**1·20**	**1·45**	



CW-521 to CW-535

CRUCIBLES, *Sintaglass,* with standard cone joint. For use with adapters CW-760. Rubber adapters not required.

Capacity, approx	20	50 ml	
Plate diameter	20	30 mm	
Ht. above plate	55	65 mm	
Weight, approx	25	35 g	
Cone	29/22	40/25	
Porosity	List Numbers		
1	**CW-521**	**CW-531**	
2	**CW-522**	**CW-532**	
3	**CW-523**	**CW-533**	
4	**CW-524**	**CW-534**	
Ten	**£9·60**	**10·60**	a
Each	**£1·06**	**1·18**	
Porosity			
5	**CW-525**	**CW-535**	
Ten	**£15·00**	**17·50**	a
Each	**£ 1·70**	**1·95**	

DRYING AND IGNITION

Sintered crucibles are specially suitable for precipitates which have to be dried to constant weight at 110°C. They can be used with boiling liquids, placed directly in a drying oven up to 150°C, and then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down below 200°C before removal from the furnace. In the case of filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filter to disrupt it.

All items on this page normally available from stock.

FILTER CRUCIBLE FITTING CHART

The following chart indicates the appropriate funnel and rubber adapter sizes required for particular crucibles when used in the various assemblies illustrated below.

Crucible		Assembly Fig. 1		Assembly Fig. 2		Assembly Fig. 3	
List No. and type	Capacity ml	Funnel CW-720 with Size No.	Adapter CW-725 Size No.	Funnel CW-720 with Size No.	Adapter CW-745 Size No.	Funnel CW-720 with Size No.	Adapter CW-750 Size No.
CW-481 to CW-515 Sintered glass	8	C	1	B	2	—	—
	15	C	3	C	3	—	—
	35	D	6	D	4	—	—
	70	E	7	—	—	—	—
CW-550 Worcester	10	C	2	B	2 *	B	2
	25	D	5	C	3 *	C	3
	35	E	5	D	4	D	4
CW-570 Vitreosil	15	C	3	B	2 *	—	—
	25	D	4	C	3 *	—	—
	35	D	5	D	4	—	—
CW-640/1/2 Porous alumina	20	C	3	C	3 *	C	3
	30	D	5	D	4	D	4
CW-650 Worcester porous	9	C	2	B	2 *	B	2
	16	C	3	C	3	B	2
	25	D	4	C	3 *	C	3
	35	D	5	D	4	D	4
CW-681/2/3/4 Vitreosil porous	30	D	4	C	3	C	3
	50	D	6	C	3	D	4

*In these instances the lower end of the rubber adapter will project below the base of the crucible and may be cut off if desired to avoid contact with the filtrate.

SPECIMEN ASSEMBLIES FOR FILTER CRUCIBLES

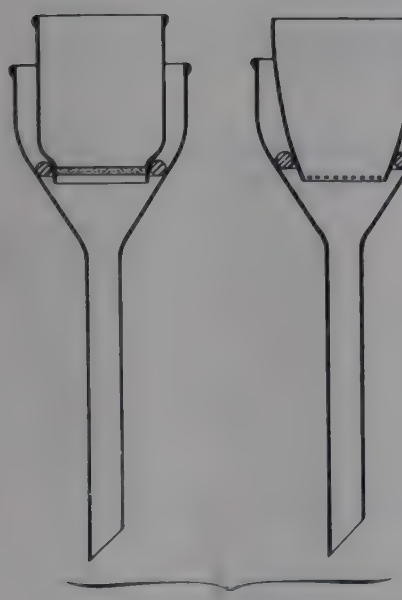


Fig. 1
Rubber ring
CW-725
with funnel
CW-720

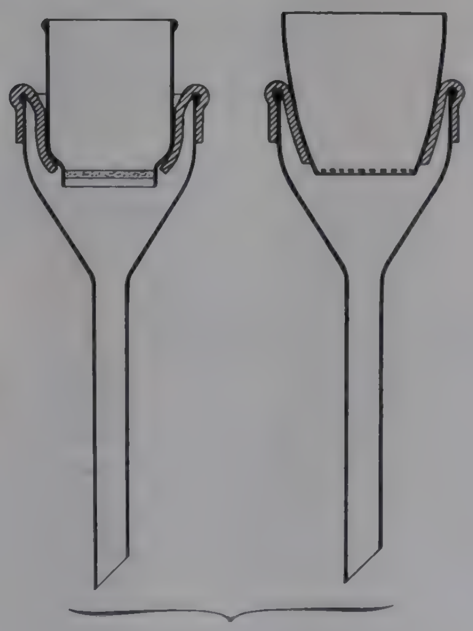


Fig. 2
Rubber cone
CW-745
with funnel
CW-720

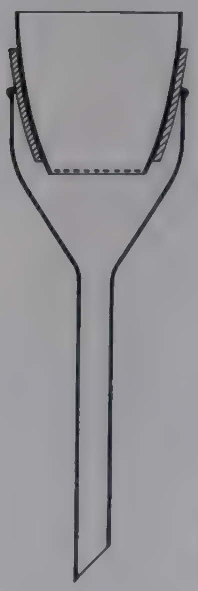


Fig. 3
Rubber cone
CW-750
with funnel
CW-720

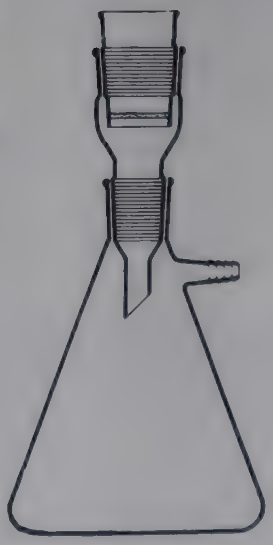


Fig. 4
Joint adapter
CW-760
with flask
FJ-290 or
Q-FB 500/3

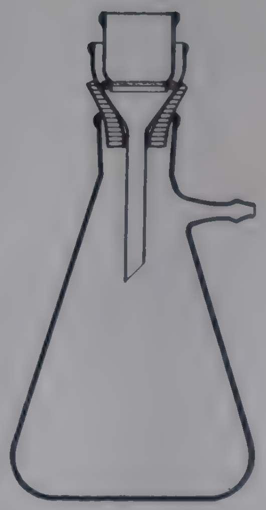
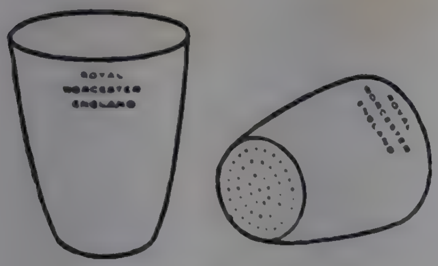
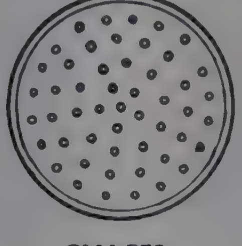


Fig. 5
Rubber ring
CW-725
with funnel
CW-720
and adapter
CW-722

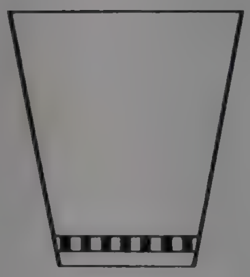
GOOCH FILTER CRUCIBLES



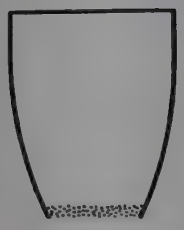
CW-550



CW-552



CW-570



CW-650

PERFORATED BASE

CW-550

CRUCIBLES, FILTER, Gooch, *Royal Worcester* **porcelain,** with perforated base.

Capacity	10	25	35 ml	
Top dia.	29	36	42 mm	
Height	31	40	45 mm	
Ten	**£1·75**	**2·20**	**2·40**	*d*
Each	**£0·24**	**0·28**	**0·30**	

CW-552 **Filter disks, for CW-550.**

Dia	15	20	23 mm	
Ten	**£0·85**	**1·00**	**1·00**	*d*
Each	**£0·16**	**0·17**	**0·17**	

CW-570

CRUCIBLES, FILTER, Gooch, *Vitreosil* **silica,** translucent with perforated base.

Capacity	15	25	35 ml	
Top dia.	34	40	45 mm	
Base dia.	23	25	27 mm	
Height	34	40	45 mm	
Ten	**£25·50**	**26·50**	**30·00**	*m*
Each	**£ 2·85**	**2·95**	**3·40**	

For suitable Gooch asbestos see AR-460 in List No. sequence.

POROUS FILTER BASE

CRUCIBLES, FILTER, Gooch, porous alumina, with curved sides. In three porosities.

CW-640 Coarse porosity. (20–30 μm).
CW-641 Medium porosity. (10–15 μm).
CW-642 Fine porosity. (<5 μm).

Capacity	20	30 ml	
Top dia.	35	41 mm	
Base dia.	21	24 mm	
Height	38	43 mm	
Ten	**£3·50**	**4·20**	*m*
Each	**£0·41**	**0·47**	

When ordering please state porosity required.

CW-650

CRUCIBLES, FILTER, *Royal Worcester* **porcelain,** for filtration of fine precipitates and subsequent ignition. With porous base to BS 1752, porosity 4.

Capacity	9	16	25	35 ml	
Top dia.	25	30	35	40 mm	
Height	28	35	40	43 mm	
Each	**£0·37**	**0·41**	**0·46**	**0·50**	*d*

VITREOSIL FILTER AND IGNITION CRUCIBLES

For filtration and subsequent ignition at temperatures up to 1000°C. Available in four porosity grades covering filtration from coarse precipitates to analytical work with very fine precipitates.

Porosities 1 to 4 in accordance with the pore sizes specified in BS 1752.

When ordering please state porosity number required.

CRUCIBLES, FILTER and IGNITION, *Vitreosil* **silica,** tall (platinum) shape with porous base.

Capacity	30	50 ml
Top dia.	38	47 mm
Disk dia.	23	30 mm
Height	44	51 mm

CW-681	Porosity No. 1	Each	**£2·95**	**4·05**	*m*
CW-682	Porosity No. 2	Each	**£3·15**	**4·50**	*m*
CW-683	Porosity No. 3				
CW-684	Porosity No. 4	Each	**£3·25**	**4·60**	*m*

SPECIMEN ASSEMBLIES of filter crucibles with adapters and funnels see page 157.

All items on this page normally available from stock.

GOOCH FUNNELS AND RUBBER ADAPTERS

CW-720

FUNNELS, (AG) **borosilicate glass,** for use with filter crucibles as shown in table on page 157.

Size No	B	C	D	E	
Int. dia.	29	33	43	53 mm	
Ten	**£2·20**	**2·70**	**2·95**	**4·20**	a
Each	**£0·28**	**0·33**	**0·35**	**0·47**	

CW-722

FLASK ADAPTER, rubber, *Gallenkamp.* A pliable, moulded rubber sleeve which fits on the conical part of Gooch crucible adapters and small Buchner funnels. The sleeve then makes a vacuum-tight joint with the rim of a filter flask so avoiding the use of a bored stopper. Convenient and economical—will not adhere to the funnel or flask—can be used again and again.

Suitable for use with:

List No.	Description	Sizes
CW-720	Gooch funnels	All
FM-601 to **FM-624**	Sintered glass funnels	
FM-631 to **FM-644**	Sintered glass funnels	
FP-460	Slit sieve funnel	
FP-495	Porcelain funnels	65 and 82 mm dia.
FP-510	Porcelain funnels	2, 3, 4 and 5

Ten **£0·86** Each **£0·16** c

CW-725

RUBBER RING ADAPTERS, precision moulded, nitrile synthetic rubber, for use with filter crucibles in funnels CW-720 as shown in table on page 157. In packs of 10.

Size No.	1	2	3	4	
Int. dia.	17	21	23	25 mm	
10 packs	**£7·80**	**7·80**	**7·80**	**7·80**	c
Pack	**£0·86**	**0·86**	**0·86**	**0·86**	

Size No.	5	6	7	
Int. dia.	29	33	43 mm	
10 packs	**£8·20**	**8·60**	**9·20**	c
Pack	**£0·90**	**0·96**	**1·02**	

CW-745

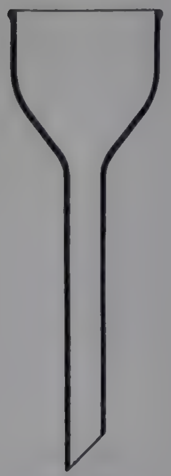
RUBBER CONES, for use with filter crucibles.

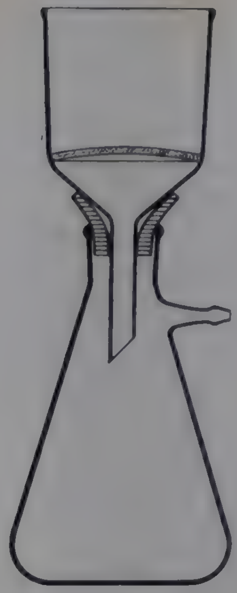
Size No.	2	3	4	
Int. dia., large end	30	40	50 mm	
Int. dia., small end	20	25	30 mm	
Length	40	45	50 mm	
Ten	**£1·40**	**1·80**	**2·20**	c
Each	**£0·21**	**0·25**	**0·28**	

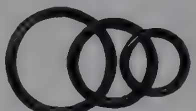
CW-750

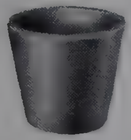
RUBBER CONES, moulded to shape of crucible, for use with filter crucibles. In packs of 10.

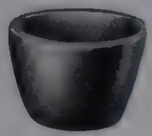
Size No.	2	3	4	
Int. dia., large end	27	34	40 mm	
Int. dia., small end	19	24	36 mm	
Length	25	31	35 mm	
10 packs	**£7·00**	**8·00**	**9·00**	c
Pack	**£0·78**	**0·90**	**1·00**	

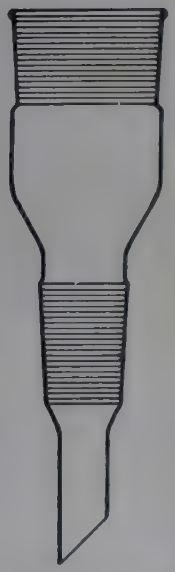

CW-720


CW-722 in use with FM-631


CW-725


CW-745


CW-750


CW-760

CW-760

CRUCIBLE ADAPTERS, (AG) standard joint, **borosilicate glass,** for use with sintered glass crucibles CW-521 to CW-535.

Socket	29/22	40/25	40/25	
Cone	24/29	24/29	29/32	
Ten	**£6·60**	**7·60**	**9·20**	a
Each	**£0·74**	**0·84**	**1·02**	

CRYOSCOPES see **DC-800** and **MW-020** in List No. sequence.

All items on this page normally available from stock.

CULTURE APPARATUS

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Other useful equipment will be found under the following headings:

Autoclaves
Filters, bacteriological
Incubators
Manipulator boxes
Microscopes
Microbiology
Ovens
Sterilizers
Water baths
Water and chemical pumps

CX-200

BOTTLES, McCartney, glass, with narrow neck and aluminium screw cap with rubber liner. Can be autoclaved.

Capacity	7	14 ml	
Pack qty.	288	144	
Pack	**£8·75**	**4·60**	c

REPLACEMENT PARTS

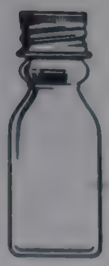
BT-335	**Caps,** aluminium, R3/20, with rubber liner ...	For prices see entries in List No. sequence.
BT-342	**Caps,** polypropylene, R3/20 ...	

CX-210

BOTTLE, McCartney, glass, capacity 28 ml. With medium neck and aluminium screw cap with rubber liner. Can be autoclaved. In pack of 144. ... Pack **£5·00** c

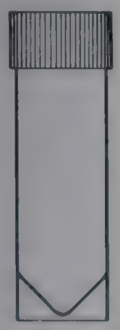
REPLACEMENT PARTS

BT-335	**Caps,** aluminium, R3/22, with rubber liner ...	For prices see entries in List No. sequence.
BT-342	**Caps,** polypropylene, R3/22 ...	


CX-200

CX-210

CX-220


CX-230

CX-215

BOTTLE, as CX-210 but with 4 mm hole in centre of metal cap to permit withdrawal of contents by a hypodermic needle puncturing the rubber liner. In pack of 144.
Pack **£5·60** c

REPLACEMENT PARTS

CX-216 **Caps** with centre hole, fitted with rubber liner. In pack of 25 ... ... Six packs **£2·30** Pack **£0·43** c

CX-220

BOTTLE, universal container, glass, capacity 28 ml. Cylindrical with wide neck and aluminium screw cap with rubber liner. Can be autoclaved. In pack of 144.
Pack **£5·40** c

REPLACEMENT PARTS

BT-335	**Caps,** aluminium, R3/28, with rubber liner ...	For prices see entries in List No. sequence.
BT-342	**Caps,** polypropylene, R3/28 ...	

CX-230

BOTTLE, universal container, clear polystyrene, expendable, capacity 25 ml. Cylindrical with wide neck and polypropylene screw cap which seals without the use of a separate insert. In pack of 10.
25 packs **£4·10** Pack **£0·24** m

ACCESSORIES

CJ-335 **Rubber cushion,** for using CX-230 in 50 ml centrifuge bucket CF-454. For price see entry in List No. sequence.

SR-772

STERILIZING RACK for 28 ml McCartney bottles and universal containers. For price see entry in List No. sequence.

All items on this page normally available from stock.

micro-organisms . . . .

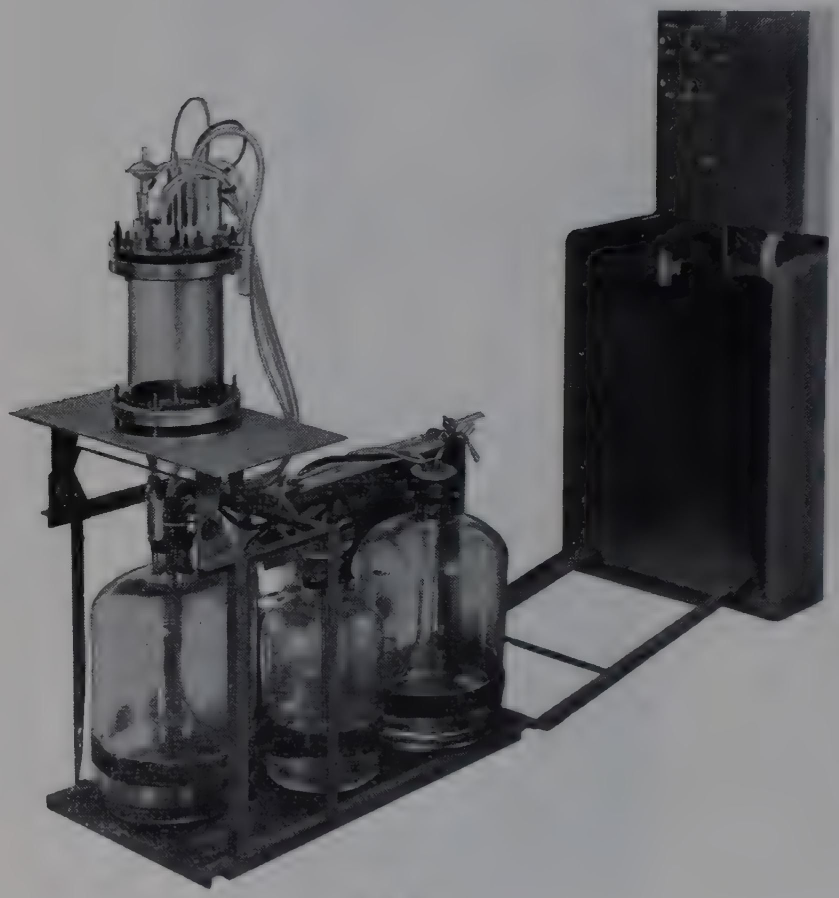
CeCa

Designed in consultation with Professor S. J. Pirt, Department of Microbiology, Queen Elizabeth College, University of London.

CULTURE APPARATUS

DESIGN FEATURES

- **Accurate auto control and strip chart record of dissolved oxygen, temperature and pH.**
- **Accurately controlled adjustable speed high power stirrer**
- **Pumped weir eliminates accretion of filamentous growths**
- **Integral trolley withdraws for autoclaving complete system *in toto***
- **Glass and stainless steel culture vessel with elastomer seals**
- **All components readily accessible**



CX-674

Gallenkamp **CeCa,** by providing close control over chemical and physical conditions, creates a stable environment for the long term growth of micro-organisms.

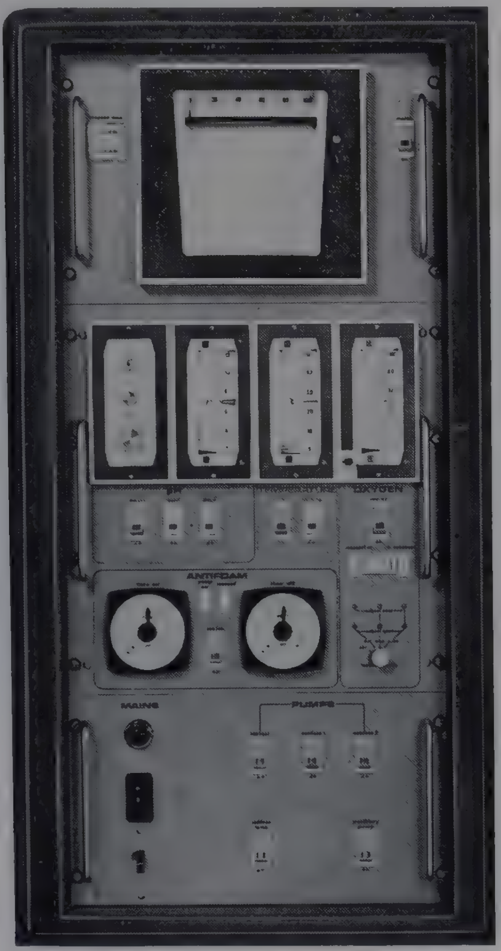
The complete system comprising culture vessel, nutrient, harvest and reagent bottles and associated tubing is constructed on an integral trolley which withdraws down a built-in ramp for easy autoclaving ***in* toto** or as individual components.

(*continued overleaf*)

Gallenkamp
REGD TRADE MARK

CONTROL SYSTEMS

CeCa provides fully automatic control of dissolved oxygen, pH and temperature within the culture. Each parameter is detected by a sensor in the culture and its value displayed on an adjustable indicating potentiometric controller. Retransmitted signals from the controllers are monitored on the six channel, chopper bar recorder.



Control Panel

Oxygen

The dissolved oxygen tension is measured by a Mackereth pattern oxygen electrode and controlled by an indicating three term proportional controller. To maintain the selected oxygen level, filtered air is introduced into the culture vessel by an air pump at a rate which is regulated by the controller. The powerful stirrer ensures efficient aeration of the culture. A valve system provides for adjustment of the maximum rate of air demand and a flowmeter displays the air input flow rate to the culture vessel. As an alternative to automatic control, manual control of air-flow is provided. For this, the auxiliary air pump feeds air to a pressure regulator and the required flow rate is set by means of an adjustable flow regulator and flowmeter.

For purging the culture vessel of carbon dioxide or for working at low oxygen tensions a nitrogen nozzle, flow regulator and flowmeter are fitted.

pH

A sterilisable combined glass and reference electrode together with a blind pH meter and an indicating controller measure the culture pH. If selected upper and lower pH limits are exceeded, the acid pump or the base pump is switched on to restore the value required.

Temperature

Culture temperature is measured by means of a stainless steel sheathed platinum resistance thermometer and indicating temperature controller. When the temperature falls below the selected value, power is supplied to the immersed stainless steel sheathed heater. When operating near ambient temperature the cooling coil can be fed with cooling water through the solenoid valve which operates alternately with the heater.

Product outlet

An adjustable weir regulates the volume contained in the culture vessel. Gravity overflow may be used for most cultures but, for filamentous growths which tend to block the weir tube by accretion, a peristaltic outlet pump is built in. Any air which is taken from the culture vessel by this pump is returned to it through a tube.

Nutrients

Provision is made for the simultaneous addition of two nutrients to the culture. Both are pumped by adjustable speed peristaltic pumps from reservoir bottles mounted on the trolley. The rate of addition of the nutrients can be measured at intervals by using a stopwatch in conjunction with built-in burette tubes.

The standard apparatus is supplied with equipment for only one nutrient but an accessory kit is available for the second.

Stirrer

The culture is stirred by means of a centrifugal impeller of the Porton type. It is driven by a quiet induction motor through a sheathed flexible coupling. Its shaft runs in ball races with a double sealed, lubricant packed gland. Stirring rate is continuously variable and accurately controlled without loss of power at low speeds.

Antifoam

Antifoam is added to the culture by means of a peristaltic pump. Control of addition rate is by adjustable timers which regulate the duration of each addition and the interval between them.

Elapsed time indicator

A digital indicator reading the time of each run and the total running time of the apparatus.

CeCa (continued)

MAIN STAND

The culture vessel, all the controls and the operational systems are mounted in one compact console.

The culture vessel, nutrient bottles, reagent bottles, associated tubings and apparatus are mounted on a single trolley which can be withdrawn from the front of the console; to facilitate this operation a fold-away ramp is built-in. The loaded trolley is of suitable size (see Technical Data) to be autoclave sterilized as a complete sealed system (excluding the oxygen electrode which has to be chemically sterilized and introduced aseptically later). As the net weight of the equipped trolley without reagents is approximately 76 kg special provisions may have to be made for loading it into the autoclave. The autoclave cycle must include air removal with steam flush, steam sterilizing at 1·05 kgf/cm² for 2 hours, steam shut-off and self-cooling followed by air admission through bacteriological filters. For users not equipped with a large autoclave, the system can be divided at convenient points for sterilization in smaller groups. This method however may increase the risk of contamination during final assembly. The pumps for nutrient, product outlet, acid, base and antifoam are all of the peristaltic type and they are mounted in readily accessible positions so that their tubes can easily be fitted after sterilization. Two air pumps are fitted, one for automatic control of dissolved oxygen tension, the other for manual control of air supply to the culture and as a pressure source for the sampling and transference of nutrients and harvest. Air pressure and flow-rate controls and meters are mounted on the panel behind the culture vessel.

On the left side of the console are mounted three instrument rack drawers which carry all the electrical and electronic controls. Each rack may be pulled forward for maintenance purposes and they can all be reached through a door on the opposite side of the console. Fluorescent lamps are mounted within the console and brightly illuminate the interior.

Nozzles are fitted at the rear of the console for connection of nitrogen and cooling water supplies to the culture vessel.

MISCELLANEOUS DETAILS

Components used to reduce the risk of contamination of the culture and to improve the ease and convenience of aseptic operations such as sampling and nutrient transfer include:—

Sampling and filling port connectors

Adapters which fit 8 mm bore tube and which may be either closed with a universal container (CX-220) or screwed to couplers for fluid transfer and inoculation.

Tubing clamps. Positive and quick acting clamps intended for control of fluid flow lines.

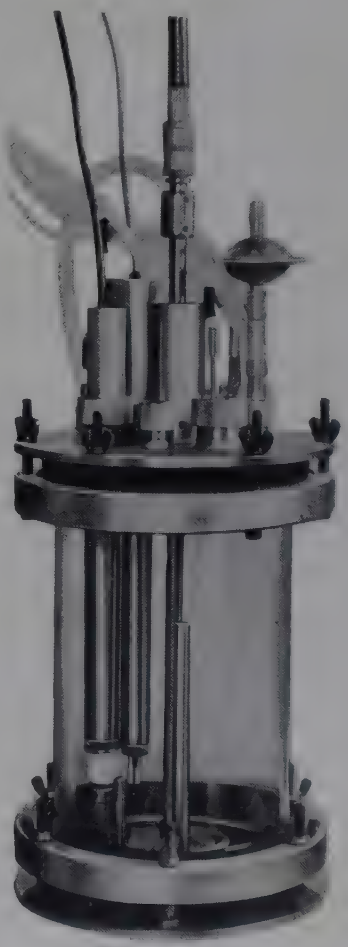
Stopper retainers. Retainers for reservoir bottle stoppers.

Air filters. Filters fitted to all air inlets and outlets to preserve sterility within the culture system. These filters cause very little back-pressure.

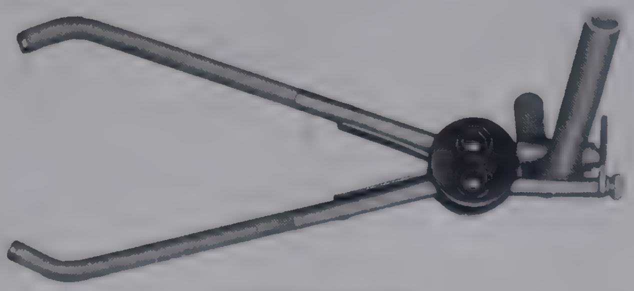
Air outlet condenser. A water cooled condenser which prevents the outlet filter being saturated by condensate from the humid atmosphere within the culture vessel.

CULTURE VESSEL

The vessel comprises a borosilicate glass cylinder which is closed at each end by a BS971 En 58 stainless steel plate and sealed by means of a moulded nitrile rubber gasket. Eight ports are welded in the upper plate and six in the lower plate. Liquid and gas access tubes enter through these ports and are sealed by means of silicone rubber stoppers which are retained securely by screwed collars. The cooling water coil is permanently welded to the lower plate.

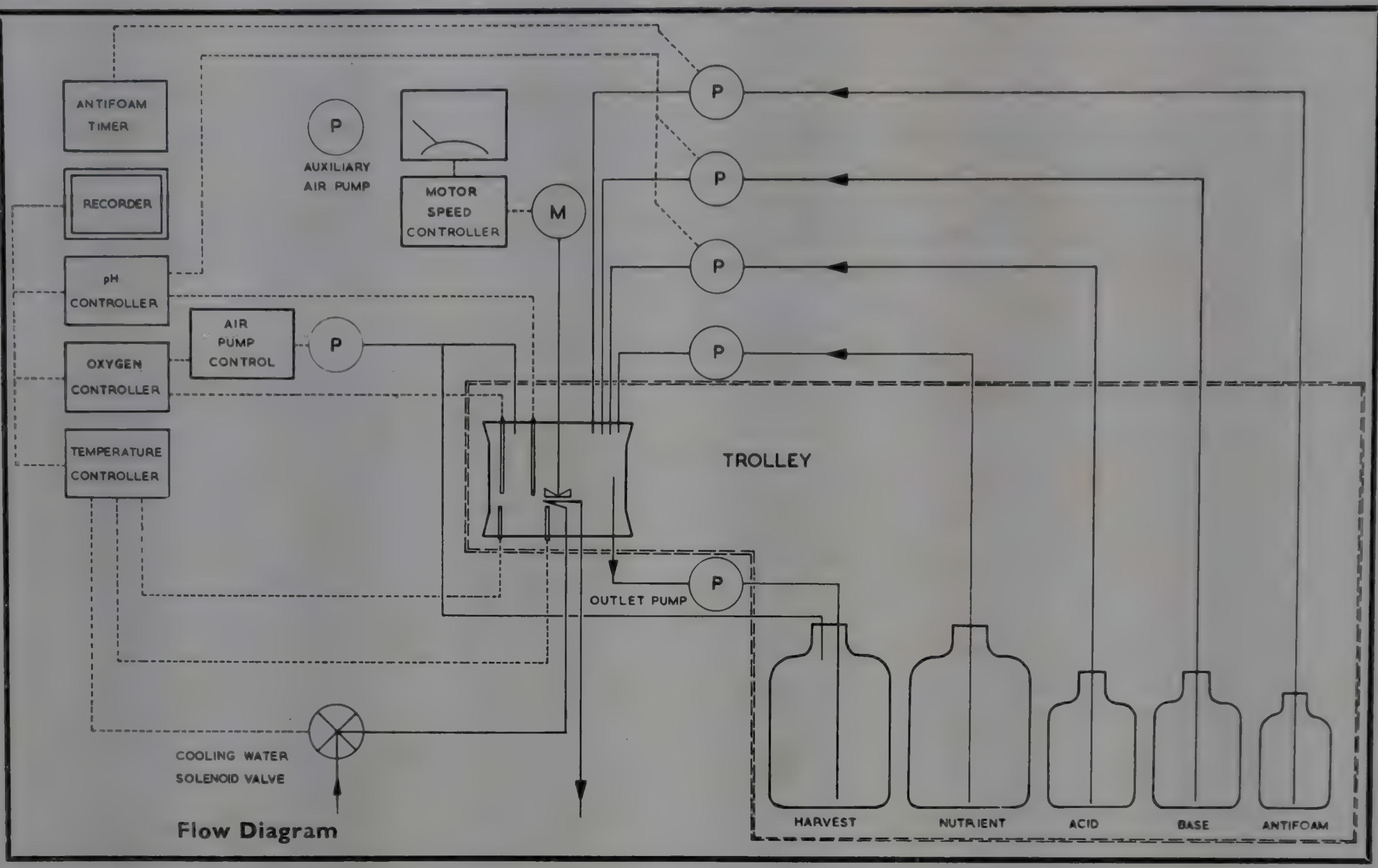


Culture Vessel



Tubing Clamp

Gallenkamp
REGD. TRADE MARK


ANTIFOAM TIMER
RECORDER
pH CONTROLLER
OXYGEN CONTROLLER
TEMPERATURE CONTROLLER
AIR PUMP CONTROL
P
AUXILIARY AIR PUMP
MOTOR SPEED CONTROLLER
M
P
P
P
P
P
TROLLEY
OUTLET PUMP
COOLING WATER SOLENOID VALVE
HARVEST
NUTRIENT
ACID
BASE
ANTIFOAM

Flow Diagram

TECHNICAL DATA

GENERAL

Stand	
Overall dimensions	196 × 66 × 96 cm
Weight, operating	390 kg approx.
Trolley	
Dimensions (culture vessel hinged down)	83 × 57 × 107 cm
Weight, for sterilising	76 kg approx.
Culture vessel	
Capacity range (working)	1·5 to 4 litres
Ports: Upper plate	4 × 25·4 mm
and	4 × 12·7 mm
Lower plate	6 × 25·4 mm

CONTROL SYSTEMS

Oxygen	
Ranges	0—10 mm Hg tension 0—100 mm Hg tension 0—200 mm Hg tension
Fluctuation	less than 2% of full scale.
Air supply, automatic	
Flow rate up to	1 litre/min
Air supply, manual	
Flow rate range	0·05 to 5 litres/min
Auxiliary air supply	
Flow rate, max.	30 litres/min
Pressure, max.	0·2 kgf/cm^2
pH	
Range	2 to 12 pH
Fluctuation, max.	0·1 pH
Acid	
Reservoir capacity	2 litres
Pump rate	25 ml/hr
Base	
Reservoir capacity	2 litres
Pump rate	25 ml/hr

Temperature	
Range	5degC below ambient to 50° C
Fluctuation, max	0·3degC
Recorder	
Scale length	150 mm
Chart speed	12·7 mm/hr
Channels	6 (3 spare)
Printing interval	10 sec/point
Stirrer	
Speed range	300 to 1500 rev/min
Nitrogen	
Supply pressure, max.	2 kgf/cm^2
Flow rate, max.	250 ml/min

FLUID FLOW SYSTEMS

Nutrient 1	
Reservoir capacity	20 litres
Supply rate range	2 ml to 5 litres/hr
Nutrient 2 (optional)	
Reservoir capacity	10 litres
Supply rate range	2 ml to 5 litres/hr
Antifoam	
Reservoir capacity	1 litre
Pump rate	25 ml/hr
Pump timer range	2 to 120 secs
Interval timer range	3 to 180 mins
Product outlet	
Receiver capacity	20 litres
Pump flow rate	9 litres/hr

SUPPLY SERVICES

Mains electricity	
Supply	220/240V 50 Hz single phase
Power consumption, max.	750W
Cooling water	
Supply pressure, max.	20 kgf/cm^2
Flow rate, max.	2·5 litres/min

CeCa (continued)

CX-650

CULTURE APPARATUS, CeCa, *Gallenkamp*, as specification, for continuous and batch culture of micro-organisms. The 5·5 litre culture vessel with electrodes, stirrer and heating equipment is mounted with all associated bottles, tubes and filters on a galvanised trolley which withdraws from the console. Pumps are fitted for addition of nutrient, acid, base, air and antifoam and for product take-off and liquid transference. Indicating controllers reading out on a 6-channel strip chart recorder are provided for pH, temperature and dissolved oxygen, with another indicating controller for stirrer speed. Includes nutrient, air and nitrogen flow rate indicators, antifoam timers and elapsed time indicator. With illustrated instructions manual. For 220/240V 50Hz single phase supplies.

Each **£4500·00** *gN*

REPLACEMENT PARTS

CX-672 **Stand-by spares kit** comprising the following:

For culture vessel	—one set gaskets and seals.
For pH system	—one electrode and one relay.
For oxygen system	—one electrode with maintenance kit and set of pump valves and diaphragms.
For temperature system	—one relay and set of sealing rings.

Plus six rolls of recorder chart paper, one set of ribbons, set of stirrer gland seals, one interior lighting starter and assorted tubes, tubing, nipples, stoppers, filters, lamps, fuses, nuts, bolts and washers ... ... Kit **£220·00** *g*

CX-674 **Trolley,** complete with culture vessel, pH and oxygen electrodes, air filters, set of reservoir bottles complete with fittings, nutrient metering tubes, tubing and sampling points ... ... Each **£795·00** *g*

CX-678 **pH electrode,** complete with lead and plug.
Each **£19·55** *m*

CX-682 **Oxygen electrode,** complete with lead and plug.
Each **£37·00** *m*

CX-686 **Maintenance kit,** for oxygen electrode, complete with chemicals ... ... Kit **£11·75** *m*

CX-690 **Culture vessel,** borosilicate glass. Glass part only.
Each **£17·00** *g*

CX-698 **Reservoir bottles,** bottles only.

Cap.	0·25	1	2	10	20 litres	
For	sub-reservoir	anti-foam	acid and base	nutrient 2	nutrient 1 and product	
Each	**£0·65**	**0·75**	**1·00**	**4·00**	**6·85**	*a*

CX-707 **Bottle filling tubes,** glass, for reagent bottle stoppers in order to replenish acid and base. Comprises plain tube with R3/28 threaded top to accept standard cap sealing stopper ... ... Pack of 2 **£1·40** *a*

CX-709 **Shrouded connectors,** glass, for use with filling tube CX-707. For 8 mm bore flexible tubing. Not threaded.
Pack of 2 **£1·80** *a*

CX-712 **Sampling and filling port connector, female,** stainless steel. For 8 mm bore flexible tubing and with R3/28 female thread for CX-220 universal containers and CX-716 male connectors ... ... Each **£4·20** *g*

CX-716 **Sampling and filling port connector, male,** glass, with R3/28 male thread for use with CX-712 female connectors. For 8 mm flexible tubing. Required when transferring large volumes of liquids ... ... Each **£0·85** *a*

CX-220 **Bottle,** universal containers.
For details and prices see entry in List No. sequence.

CX-722 **Tubes,** silicone rubber, for acid, base and antifoam pumps.
Pack of 10 **£0·80** *g*

CX-726 **Tubes,** silicone rubber, for nutrient peristaltic pumps. In packs of 5.

Bore	0·6	1	1·5	2 mm	
Pack	**£0·60**	**0·75**	**0·95**	**1·05**	*g*
Bore	3	4	6	8 mm	
Pack	**£1·25**	**1·60**	**1·85**	**2·10**	*g*

CX-728 **Tubes,** silicone rubber, for product outlet peristaltic pump, 8 mm bore ... ... Pack of 5 **£2·90** *g*

TX-805 **Tubing,** silicone rubber, bores 2, 3, 6 and 8 mm. For general purpose flexible plumbing. For details and prices see entry in List No. sequence.

CX-732 **Tubing clamp.** A simple, lightweight counter-lever clamp with spring jaws, for use on flexible tubing from 0·5 to 10 mm bore. Easily manipulated with one hand to give from drop-by-drop to steady continuous flow of liquid. The clamp shuts off when the handles are released. When used with ordinary thin wall laboratory flexible tubing the clamp will hold back water at pressures up to 1 kgf/cm^2. Handy for many general purpose laboratory applications and recommended for flow control of liquids in continuous culture apparatus ... Each **£5·25** *g*

CX-734 **Bacteriological air filter.** Sodium chloride penetration less than 0·001% at air flow rate of 10 litres/min. Length 7·6 cm, max. dia. 6·5 cm, with inlet and outlet tubes for 8 mm bore flexible tubing. Can be autoclaved.
Each **£2·10** *m*

CX-738 **Recorder chart paper** ... ... Roll **£1·40** *m*

CX-740 **Recorder ribbons.** Pack containing 2 of each colour red, blue and green ... ... Pack **£2·10** *m*

ACCESSORIES

CX-770 **Maintenance kit,** for CeCa, comprising set of screwdrivers, adjustable and pin spanners, AF, BA and BSW spanners, scissors, lubricating oil, silicone grease for stirrer gland and set of pH buffer powders.
Kit **£57·50** *g*

CX-774 **Second nutrient kit,** comprising 10 litre reservoir with stopper and tubes, pump, tubing, etc. for installation by user ... ... Kit **£270·00** *g*

CX-780 **Antifoam,** polypropylene glycol 2000. 250 ml.
Each **£0·45** *g*

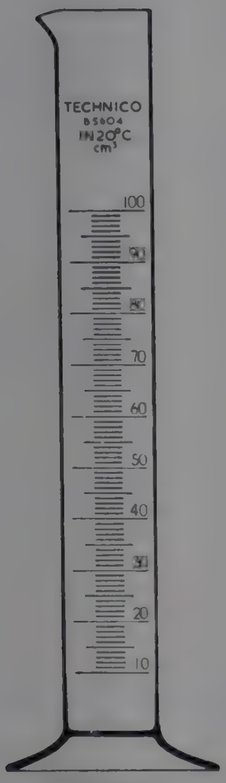
AUTOCLAVE FOR TROLLEY
We will be pleased to advise on a suitable autoclave to accept the complete trolley.

Items on this page normally available from stock except those coded *N*

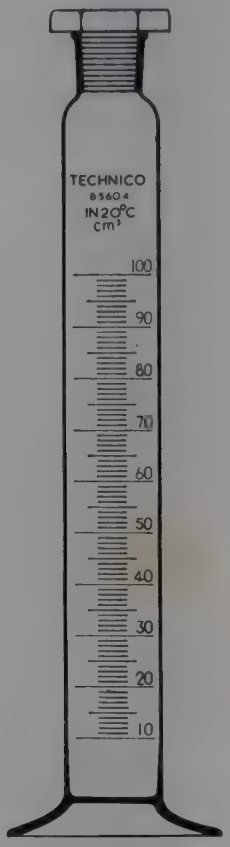
Technico GRADUATED CYLINDERS

REGD. TRADE MARK

With permanent graduations and inscriptions in amber stain



CY-104



CY-244

Technico graduated glass cylinders are manufactured in our own factory to comply with the requirements of BS 604. The volumetric tolerances are as shown below.

Extract from BS 604

To contain	cm³	5	10	25	50	100
Subdivided in	cm³	0·1	0·2	0·5	1	1
Tolerance	±cm³	0·1	0·15	0·25	0·5	0·8
To contain	cm³	250	500	1000	2000	—
Subdivided in	cm³	2	5	10	20	—
Tolerance	±cm³	1·5	2·0	4·0	8·0	—

Technico stoppered cylinders up to 500 cm³ have interchangeable socket necks to BS 572 fitted with polypropylene hexagonal head dustproof stoppers. These stoppers are inert to almost all reagents and provide protection against the rim of the cylinder becoming chipped. If on occasions, for special purposes, glass stoppers are essential then stoppers SU-520 are suitable.

Cylinders of 1000 and 2000 cm³ have well ground, individually fitted glass stoppers.

The works certificate of examination states the volume of distilled water at 20°C contained between zero and each of five points on the graduated scale.

CYLINDERS with spout

List No.	Capacity cm³ Subdivided cm³		5 0·1	10 0·2	25 0·5	50 1·0	100 1·0	250 2·0	500 5·0	1000 10·0	2000 20·0	
CY-104	*Technico*	Dozen	£ **3·60**	£ **3·70**	£ **4·20**	£ **4·80**	£ **5·50**	£ **7·80**	£ **11·40**	£ **15·50**	£ **24·50**	a
		Each	**0·36**	**0·37**	**0·41**	**0·46**	**0·51**	**0·74**	**1·06**	**1·45**	**2·30**	
CY-105	*Technico* with Works Certificate	Each	**1·10**	**1·16**	**1·40**	**1·45**	**1·55**	**1·95**	**2·40**	**3·10**	**4·40**	a

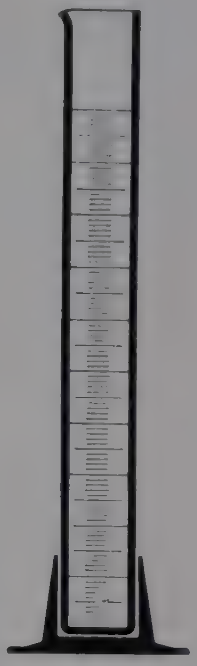
CYLINDERS with stopper

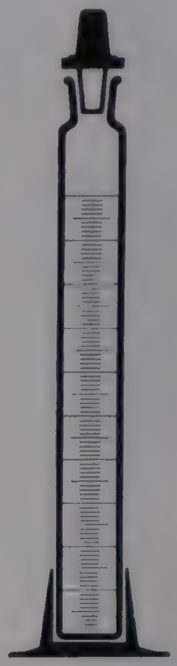
List No.	Capacity cm³ Subdivided cm³ Stopper size		5 0·1 10/13	10 0·2 10/13	25 0·5 14/15	50 1·0 14/15	100 1·0 19/17	250 2·0 24/20	500 5·0 24/20	1000 10·0 —	2000 20·0 —	
CY-244	*Technico*	Dozen	£ **5·00**	£ **5·10**	£ **5·90**	£ **7·20**	£ **8·20**	£ **14·80**	£ **22·50**	£ **26·50**	£ **40·00**	a
		Each	**0·47**	**0·48**	**0·55**	**0·68**	**0·76**	**1·40**	**2·10**	**2·50**	**3·80**	
CY-245	*Technico* with Works Certificate	Each	**1·16**	**1·35**	**1·45**	**1·65**	**1·70**	**2·45**	**3·50**	**4·20**	**5·50**	a

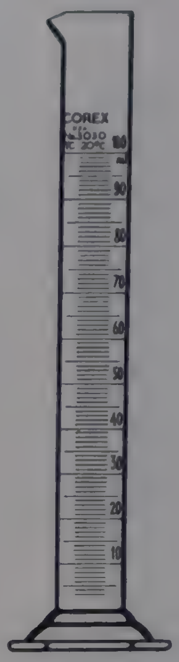
All items on this page normally available from stock.

CYLINDERS, graduated, *Pyrex brand* glass, to BS 604, with pressed hexagonal foot.

	CY-254 with spout			**CY-264** stoppered			
Capacity	Std. pack qty.	Std. pack	Each	Std. pack qty.	Std. pack	Each	
cm³		£	£		£	£	
10	12	7·10	0·66	12	12·40	1·16	*d*
25	12	7·70	0·72	12	13·40	1·25	*d*
50	12	8·10	0·76	12	14·10	1·35	*d*
100	6	4·70	0·86	12	15·30	1·45	*d*
250	6	6·35	1·14	12	19·40	1·80	*d*
500	6	9·10	1·65	12	25·70	2·45	*d*
1000	4	8·00	2·15	6	16·80	3·10	*d*
2000	4	10·45	2·80	4	15·15	4·10	*d*


CY-270


CY-275



CY-280

CY-270

CYLINDERS, graduated, with spout, *Pyrex brand* glass, with detachable polythene foot.

Capacity	50	100	250 cm³	
Std. pack of 12	£3·45	4·10	5·55	*d*
Each	£0·35	0·40	0·52	

CY-271 **Glass part only** for CY-270.

Capacity	50	100	250 cm³	
Std. pack of 12	£2·95	3·60	4·75	*d*
Each	£0·31	0·36	0·41	

CY-275

CYLINDERS, graduated, *Pyrex brand* glass, with detachable polythene foot and interchangeable plastics stopper.

Capacity	50	100	250 cm³	
Stopper size	14/15	19/17	24/29	
Std. pack of 12	£5·25	6·05	8·30	*d*
Each	£0·49	0·57	0·78	

CY-276 **Glass part only** for CY-275.

Capacity	50	100	250 cm³	
Std. pack of 12	£4·10	4·90	6·65	*d*
Each	£0·40	0·46	0·62	

COREX® GRADUATED CYLINDERS

Gallenkamp are appointed exclusive distributors in the United Kingdom of *Corex* products manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the trademark given by Corning to laboratory glassware made from a special type of glass and treated by a chemcor ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

Corex® glassware has a much greater surface hardness than ordinary glass and is so better able to resist the scratching and chipping which weaken ordinary glass and are a major cause of breakage, as well as constituting a danger from cross-contamination.

Corex® graduations and inscriptions are as permanent as the glass itself and will remain sharply legible throughout the whole long life of the articles.

Corex® glassware is far more resistant to chemical attack than ordinary borosilicate, will withstand repeated steam sterilisation without visible clouding, and can be used up to 300°C without damage.

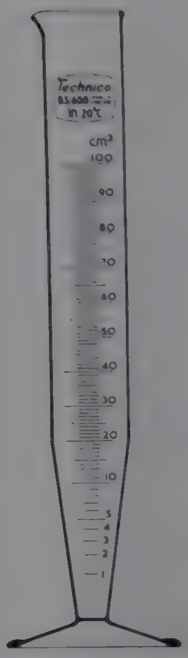
Any *Corex* item which becomes unserviceable in normal use within twelve months from date of purchase will be replaced free of charge.

***CY-280**

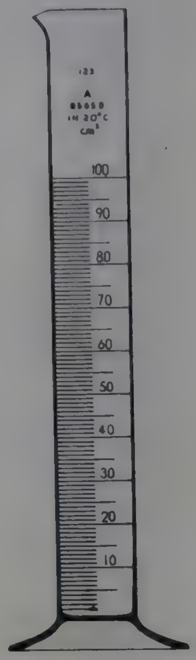
CYLINDERS, graduated, *Corex* 3030, with permanently marked graduations.

To contain	50	100 cm³	
Subdivided	1	1 cm³	
Four	£13·25	15·50	*d*
Each	£3·60	4·20	

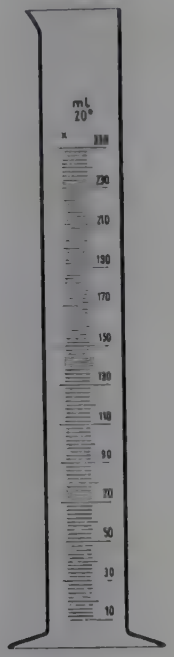
All items on this page normally available from stock.



CY-304



CY-316



CY-353
CY-362

DISTILLATION RECEIVERS to BS 658

With permanent graduations and inscriptions in amber stain

CY-304

DISTILLATION RECEIVER, glass, *Technico* Class B, **Crow** pattern to BS 658 type 1. Capacity 100 cm³.

Dozen **£14·00** Each **£1·30** *a*

CY-314

DISTILLATION RECEIVERS, glass, *Technico* Class B, **cylindrical** pattern to BS 658 type 2.

Capacity	100	200 cm³	
Dozen	**£10·40**	**14·00**	*a*
Each	**£ 0·98**	**1·30**	

CY-316

DISTILLATION RECEIVERS, glass, *Technico* Class A, **cylindrical** pattern to BS 658 type 2.

Capacity	100	200 cm³	
Dozen	**£24·00**	**31·00**	*a*
Each	**£ 2·25**	**2·90**	

CY-353

CYLINDERS, polypropylene, with pouring spout and moulded calibrations within BS 604 tolerances.

To contain	10	25	50	100 cm³	
Subdivided	0·1	0·5	1	1 cm³	
Ten	**£3·00**	**3·75**	**4·90**	**6·75**	*m*
Each	**£0·36**	**0·43**	**0·54**	**0·74**	

To contain	250	500	1000	2000 cm³	
Subdivided	2	5	10	20 cm³	
Ten	**£8·50**	**14·00**	**17·40**	**29·75**	*m*
Each	**£0·94**	**1·55**	**1·95**	**3·30**	

***CY-362**

CYLINDERS, transparent acrylic, with pouring spout and moulded calibrations within BS 604 tolerances.

To contain	10	25	50	100 cm³	
Subdivided	0·1	0·5	1	1 cm³	
Ten	**£3·25**	**4·25**	**5·15**	**7·25**	*m*
Each	**£0·38**	**0·47**	**0·57**	**0·80**	

To contain	250	500	1000	2000 cm³	
Subdivided	2	5	10	20 cm³	
Ten	**£9·50**	**15·75**	**19·75**	**33·00**	*m*
Each	**£1·06**	**1·75**	**2·20**	**3·70**	

HT-500

CYLINDERS, ungraduated, for use as hydrometer jars. For details see entry in List No. sequence.

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Most British Standards prepared or revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓐ or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

Technico DAIRY PRODUCTS TEST UNIT

REGD. TRADE MARK

For rapid and accurate routine determinations of fats, total solids and moisture in dairy and allied food products.

DB-100

The unit is designed to reduce the time and labour normally entailed in evaporating, drying and weighing operations. Fats are extracted by means of a centrifuge, hotplate vacuum ovens are used for evaporating and drying, and samples are cooled in water-cooled desiccators.

The unit permits determinations of both fats and total solids to be carried out simultaneously by one operator from one bench position, a factor which makes for speed and renders the unit ideal for multiple routine determinations.

The main sub-assemblies include:—

Solids determination sub-assembly comprising a thermostatically controlled vacuum oven with a tray for the drying agent, a cooled desiccator and a flush-mounted hotplate built on a sheet steel fabricated cupboard which is used for storage of glassware and metal dishes.

Fats determination sub-assembly similar to the solids determination sub-assembly but with a hooded hot-plate and including an 8-position centrifuge. The base of this section houses the power unit and is fan ventilated to remove any inflammable vapours.

Power unit incorporating a $\frac{1}{4}$ hp induction motor which, through V-belts, drives a vacuum pump, a powerful extraction fan and the coolant pump.

Control panel. All electrical and vacuum controls are grouped into a desk control panel between the solids and fats sub-assemblies. Electrical controls include the mains switch, separate switches for the motors and ovens, regulators for the hotplates, electrical timers and alarm reset switches. Vacuum controls comprise two valves and their respective gauges.

Coolant tank. This is mounted at the rear of the centre section and is a large surface area tank which maintains the coolant practically at room temperature so that samples may be cooled prior to weighing.

Balance table. A strong wooden teak table which is independently mounted so as to be vibration-free. It is suitable for mounting a modern aperiodic balance provided the floor is firm.

Reagents dispensary with reagent reservoir and three 100 cm^3 and two 20 cm^3 vacuum filling auto burettes.

Details and quotations on application.

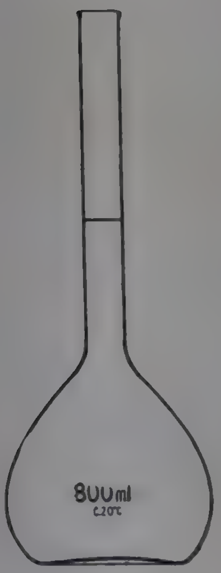
Please state voltage and nature of supply.

BACTERIOLOGICAL TESTS

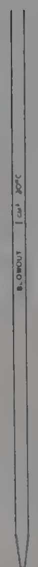
COLIFORM TEST to BS 895, for detecting bacteria of the coli-aerogenes group.

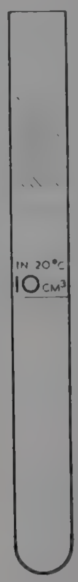
PM-344	**Pipettes,** graduated, *Technico.*
TF-122	**Durham tube,** 35 × 8 mm dia.
TF-128	**Test tube,** dilution, 150 × 19 mm dia.
TF-128	**Test tube,** 150 × 16 mm dia.
WF-360 et seq.	**Water baths, thermostatic,** stainless steel, electrically heated.
WF-390	**Rack,** with numbered positions to hold ten tubes for incubation in water bath.

For details and prices see entries in List No. sequence.



DB-200


DB-210



DB-220

METHYLENE BLUE REDUCTION TEST to test the keeping quality of pasteurised milk.

DB-200

FLASK, 800 cm³, unstoppered, for the preparation of methylene blue solution ... ... Each **£0·90** *m*

DB-210

PIPETTE, blow-out, one mark, 1 cm³.
72 **£10·00** Ten **£1·55** Each **£0·22** *m*

DB-220

TEST TUBE, rimless, 150 × 16 mm dia., with ring graduation at 10 cm³ and sandblast badge for pencil notations. 72 **£2·50** Ten **£0·40** Each **£0·13** *m*

SU-760	**Rubber stopper,** size No. 13, for closing tubes DB-220.
SR-800	**Sterilising box,** for pipettes.
WF-360 et seq.	**Water baths, thermostatic,** electrically heated.
WF-390	**Rack,** with numbered positions to hold ten tubes DB-220 for incubation in water bath.

For prices of above see entries in List No. sequence.

PLATE COUNT, the classical method for estimating numbers of bacteria in milk and other materials.

DB-210	**Pipette, blow out,** 1 cm³.
CX-240 et seq.	**Petri dishes,** for plating milk with nutrient medium.
CX-300	**Colony counter,** *Gallenkamp,* for counting bacteria.
IH-100	**Incubator,** *Gallenkamp,* electrically heated and thermostatically controlled, for incubating Petri dishes at 37°C.
SR-820	**Sterilising box,** for Petri dishes.

For prices of above see entries in List No. sequence.

Gallenkamp GENERAL PURPOSE WATER BATH

10 LITRE CAPACITY

WF-360

- *Compenstat* control to 100°C.
- Compact design—stainless steel interior.
- Temperatures controlled to within 0·5degC.
- Gabled cover and cooling coil optionally available.

WF-360	**WATER BATH** with motor stirrer.
WF-390	**RACK** for coliform, methylene blue and phosphatase tests in dairy products.

For full details see entries in List No. sequence.

All items on this page normally available from stock.

FATS DETERMINATION

GERBER METHOD, to BS 696, for the determination of the percentage of fats in milk and its products.

BUTYROMETER TUBES, to BS 696, with plain neck for lock stoppers DC-130.

List No.	Application	Capacity	Range	Ten	Each	
				£	£	
DC-030	Skim milk	10·94 cm³	4% in 0·1	**6·80**	**0·76**	*m*
DC-032	Milk	10·94 cm³	8% in 0·1	**8·20**	**0·92**	*m*
DC-036	Cheese	3 g	40% in 1·0	**7·80**	**0·86**	*m*
DC-038	Cream	5 g	70% in 1·0	**7·80**	**0·86**	*m*

DC-130

STOPPERS, LOCK, for tubes with plain necks. In pack of 10 ... ... 10 packs **£8·00** Pack **£0·90** *m*

DC-132

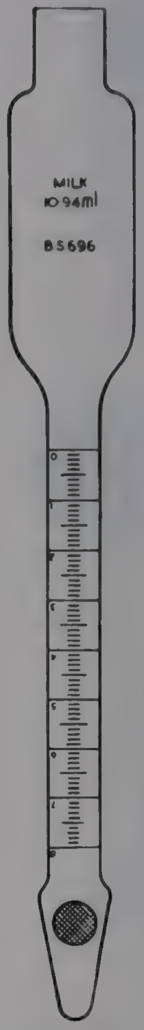
KEY, for lock stoppers DC-130; one key sufficient for any number of stoppers ... ... Each **£0·40** *m*

DC-150

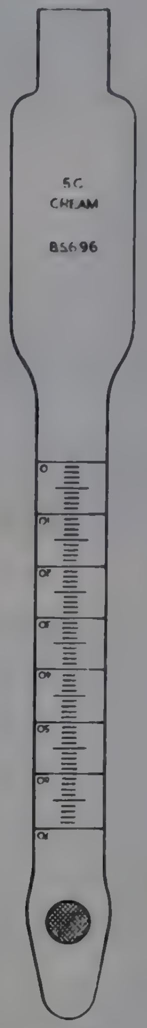
BRUSH, for cleaning butyrometer tubes. Ten **£0·90** Each **£0·16** *c*

PIPETTES, *Technico*, to BS 696.

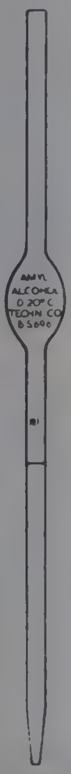
List No.	To deliver	Capacity	Dozen	Each	
			£	£	
DC-200	Amyl alcohol	1 cm³	**2·50**	**0·27**	*a*
DC-210	Sulphuric acid	10 cm³	**3·70**	**0·37**	*a*
DC-220	Milk	10·94 cm³	**4·10**	**0·40**	*a*



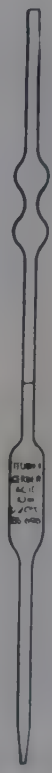
DC-032



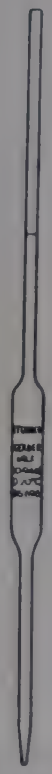
DC-038



DC-200



DC-210



DC-220

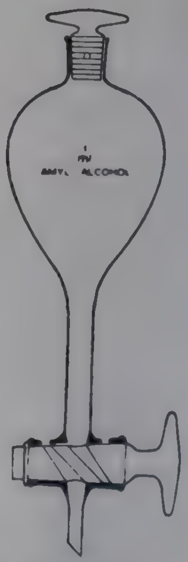
AUTOMATIC MEASURES, to BS 696.

List No.	To deliver	Capacity	Each	
			£	
DC-230	Amyl alcohol	1 cm³	5·90	*m*
DC-240	Sulphuric acid	10 cm³	6·00	*m*

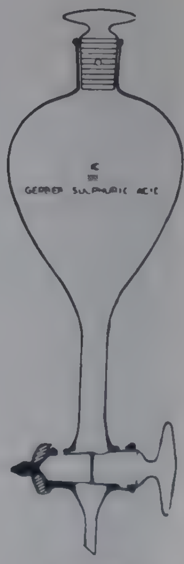
PM-714 **Measure, automatic,** for delivering 10 cm³ quantities of sulphuric acid for the Gerber test. For price see entry in List No. sequence.

DC-260

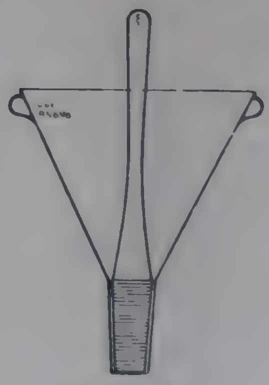
FUNNEL, glass, (AG), to BS 696, for weighing cream or cheese for the Gerber and Babcock tests. Fitted with standard joint 7/16 and hollow stopper. Ten **£14·00** Each **£1·55** *a*



DC-230

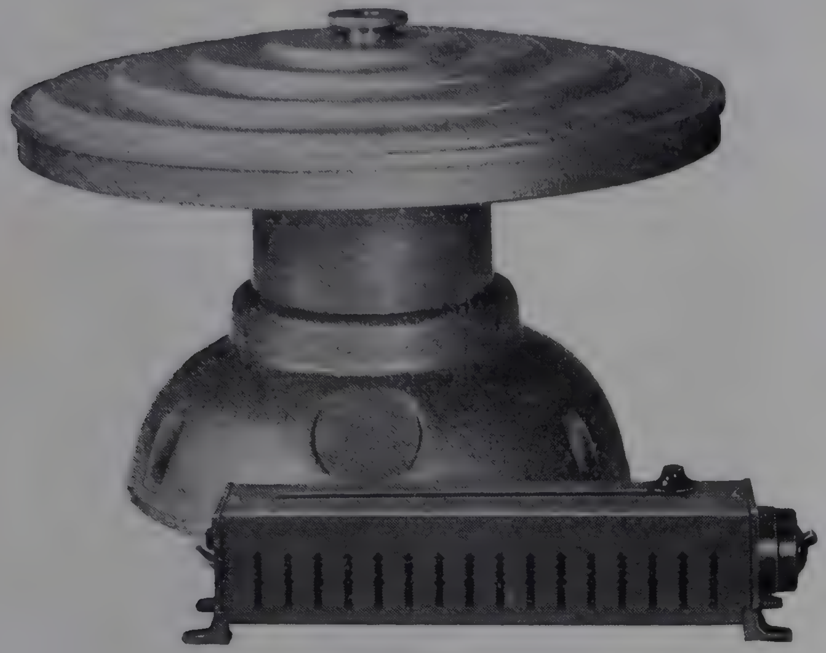


DC-240

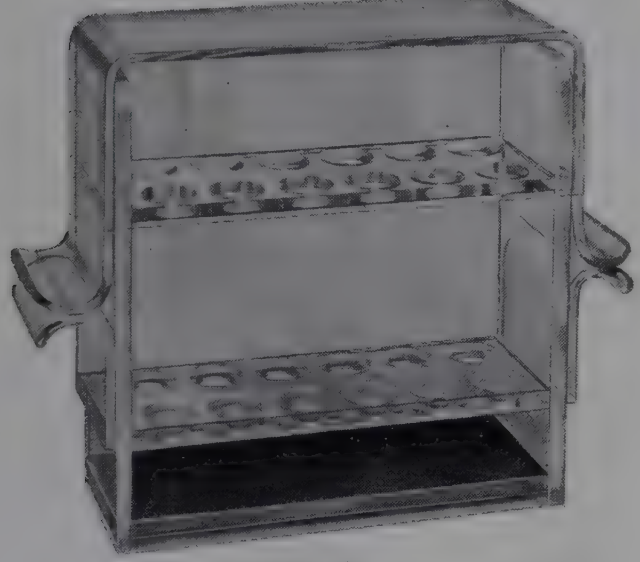


DC-260

All items on this page normally available from stock.



DC-360



DC-450

DC-360

CENTRIFUGE, Gerber, electrically operated by ¼ hp universal motor to run at approximately 1100 rev/min, using the speed regulating rheostat supplied as a separate unit. For 230/250V a.c. single phase or d.c. supplies. To take heads DC-368 from 8 to 24 tubes. **With rheostat but without head or speed indicator.** Each **£31·40** *fN*

ACCESSORIES

DC-364 **Speed indicator,** bubble type, for DC-360. Each **£3·65** *f*

DC-368 **Heads,** to fit DC-360.

To take	8	12	16	24 tubes	
Each	£10·55	11·45	12·35	14·15	*fN*

DC-450

STAND, clear plastics, for butyrometer tubes, complete with plastics cover protecting operator against acid splash. To take 12 tubes ... ... Each **£10·40** *m*

Thermostatic water baths and racks for butyrometers, details on application.

FATS by RÖSE-GOTTLIEB method.

This method described in BS 1741 depends on the breaking down of fat particles and subsequent extraction with ether. The extraction tubes are available with either short or long (siphon) delivery tubes and a 19/17 stopper is supplied with each tube for closure when shaking.

List No.		Ten	Each	
		£	£	
DC-702	**Short tube pattern**	8·80	0·98	*a*
DC-706	**Long tube pattern**	8·80	0·98	*a*

FREEZING POINT OF MILK by the Hortvet method, for the determination of the amount of added water in accordance with BS 3095.

DC-800

CRYOSCOPE, Hortvet, using ether to super-cool the sample. The apparatus, complete with all accessories except thermometers, is mounted on a stand and conforms to the requirements of BS 3095. With electrically driven stirrer and air compressor. For 110 or 200/250V 50 Hz single phase supplies ... Each **£70·00** *fN*

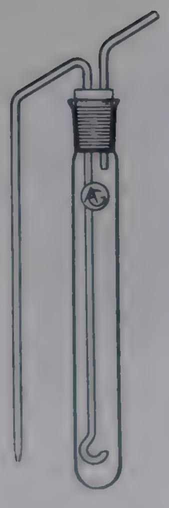
When ordering please state voltage and frequency of supply.

DC-806

THERMOMETER, Hortvet, to BS 3095, scale span −2·0°C to +1·0°C in 0·01°C, for partial (175 mm) immersion. Overall length 660 mm, stem diameter 8 to 10 mm ... ... Each **£14·25** *c*

DC-808

THERMOMETER, Hortvet, to BS 3095, scale span −5°C to +5°C in 0·5°C for partial (200 mm) immersion. Overall length about 470 mm, stem diameter 6 to 8 mm. Each **£7·75** *c*

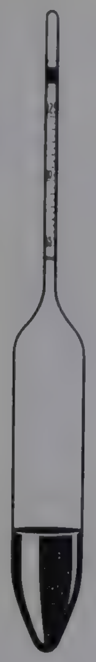


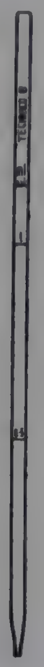
DC-706

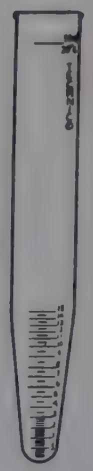
DC-800

HYDROMETER, to BS 734, for use in milk testing (LACTOMETERS)

DC-900
DENSITY HYDROMETER, for use in normal milk; range 1·025 to 1·035 g/cm³, subdivided 0·0002 g/cm³. Overall length 245 mm ... ... Each **£1·25** *m*


DC-900


DE-120


DE-600

MOISTURE IN BUTTER DETERMINATION,

to BS 769, requires apparatus which may be selected from the following:

BA-810	**Balance,** *Mettler* P160, direct reading. **Balances,** other patterns by Mettler, Oertling and Stanton will be found listed under the heading **BALANCES.**
BH-220	**Basin,** nickel, flat form, 7 cm dia.
BH-230	**Basin,** as BH-220, but with cover.
BH-280	**Basin,** stainless steel, flat form, 7 cm dia.
BH-285	**Basin,** as BH-280, but with drop-in cover.
OV-160	**Oven,** drying, to BS 2648, electrically heated, for temperatures up to 250°C, with thermostatic control.
MV-600	**Oven,** vacuum, for moisture determinations. For temperatures up to 140°C, with thermostatic control. For details and prices of above see entries in List No. sequence.

PHOSPHATASE TEST, for pasteurised milk.

Destruction of phosphatase enzyme in milk by pasteurisation as indicated by its activity on various phenolic substances is accepted as a measure of the destruction of **Myco tuberculosis,** the most heat resistant of the ordinary pathogenic bacteria to be found in milk.

DE-120
PIPETTE, *Technico,* **blow-out,** two mark, 0·5 and 1·0 cm³ ... ... Dozen **£2·10** Each **£0·24** *a*

DB-210	**Pipette, blow-out,** 1 cm³.
DB-220	**Test tube,** 150×16 mm, with one mark at 10 cm³.
WF-360 et seq.	**Water baths, thermostatic.**
WF-390	**Rack,** with numbered positions to hold ten tubes 150×16 mm. For prices of above see entries in List No. sequence. **Lovibond comparators** with colour grading disks for Kay and Graham and for Aschaffenburg and Mullen phosphatase tests, detailed quotation on application.

DE-600
SOLUBILITY INDEX TUBE, *Technico,* 50 cm³, graduated 0·1 cm³ from 0·5 to 1 cm³, 0·2 cm³ from 1 to 3 cm³, and 0·5 cm³ from 3 to 15 cm³. Accepted by Gerber centrifuge DC-360. Dozen **£10·80** Each **£1·02** *a*

Gallenkamp
REGD. TRADE MARK

UNIVERSAL TORSION VISCOMETER

For routine viscosity measurements of dairy products.

For use with liquids with Newtonian or anomalous viscosities.
Range 0·25 to 10³ poise.

- **Accurate results obtainable by unskilled operators**
- **Rapid determinations**
- **No thermostatic bath required**
- **Results unaffected by suspended solids**

VS-010

For full details see VS-010 et seq. in List No. sequence.

All items on this page normally available from stock.

LABORATORY DEIONISERS

DH-604

The water delivered by the deionisers listed on the following pages is not necessarily pyrogen free **and is therefore unsuitable for clinical injections.**

NOTE: Cartridge regeneration for deionisers DH-630, DH-640, DH-675 and DH-690.

Cartridges must be returned to the manufacturer for regeneration. Cartridge exchange vouchers are issued for this purpose and are obtainable only from the manufacturer. Therefore to ensure uninterrupted supplies of deionised water the initial purchase of a replacement cartridge pack is recommended.

DH-604

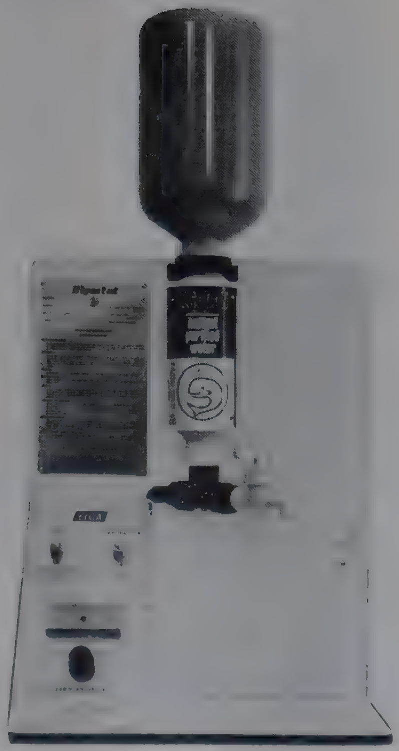
DEIONISER, *Elgastat,* **Model B114.**

Cartridge: Mixed bed, expendable.
Mounting: Wall.
Output: 25 to 100 litres tap water depending on hardness.
Flow rate: 36 litres/hr.
Average effluent quality: 1×10^6 ohm/cm^3.
Effluent purity: 0·1 ppm silica; 0 ppm CO_2
Effluent pH: 6·5 to 7.
Conductivity meter: Battery operated.
Supply pressure: 0·7 kgf/cm^2 min.
Overall dimensions: 16 × 14 × 38 cm high.
Weight: 1·6 kg net.
Inlet: Hose with tap fitting provided.
Outlet: For 6·35 mm i.d. flexible tubing.

Supplied with dry cell battery and five *Elgacan* C114 cartridges ... ... Each **£17·50** *m*

REPLACEMENT PART

DH-606 Cartridges, *Elgacan* C114 ... Pack of 4 **£4·50** *m*



DH-615

DH-615

DEIONISER, *Elgastat,* **Model B102 Mark II** for U.K. only.

Cartridge: Mixed bed, expendable.
Mounting: Bench.
Output: 30 to 600 litres tap water depending on hardness.
Flow rate: 15 litres/hr.
Average effluent quality: 4×10^6 ohm/cm^3.
Effluent purity: 0·1 ppm silica; 0 ppm CO_2.
Effluent pH: 6·5 to 7.
Conductivity meter: Battery operated.
Supply pressure: Gravity feed from reservoir tank fitted.
Overall dimensions: 30 × 20 × 70 cm high.
Weight: 3·7 kg net
Outlet: Free flow nozzle.

Supplied with dry cell battery and five *Elgacan* C114 cartridges ... ... Each **£45·00** *m*

DH-618

DEIONISER, *Elgastat,* **Model B102 Mark II,** as DH-615 but export model, battery operated. With dry cell battery and five *Elgacan* C114 cartridges ... Each **£49·50** *m*

REPLACEMENT PART for DH-615 and DH-618

DH-606 Cartridges, *Elgacan* C114. For details and price see entry above.

All items on this page normally available from stock.

DH-630

DEIONISER, *Elgastat,* **Model B125,** for U.K. only.

Cartridge:	Mixed bed. (See Note on p. 182 for regeneration).
Mounting:	Bench.
Output:	70 to 900 litres tap water depending on hardness.
Flow rate:	50 litres/hr.
Average effluent quality:	2×10^6 ohm/cm^3, BP quality.
Effluent purity:	0·1 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Conductivity meter:	Mains operated 200/250V a.c.
Supply pressure:	0·7 kgf/cm^2 max.
Overall dimensions:	Height 50 cm, base dia. 7·5 cm.
Weight:	2·9 kg net.
Inlet:	Nozzle for 10 mm bore tubing.
Outlet:	Nozzle for free flow.
With one cartridge C408	Each **£22·00** *m*

REPLACEMENT PART
DH-632 Cartridge, C408 ... ... Each **£7·50** *m*

DH-633

DEIONISER, *Elgastat,* **Model B125/B,** as DH-630 but export model and battery operated. With dry cell battery and one cartridge C408F ... Each **£32·00** *m*

REPLACEMENT PART
DH-636 Ion-exchange resin, C208 sufficient for 20 charges. Pack **£32·00** *m*

DH-640

DEIONISER, *Elgastat,* **Model B113,** for U.K. only.

Cartridge:	Mixed bed. (See Note on p. 182 for regeneration).
Mounting:	Wall.
Output:	160 to 4000 litres tap water depending on hardness.
Flow rate:	90 litres/hr.
Average effluent quality:	2×10^6 ohm/cm^3, BP quality.
Effluent purity:	0·1 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Conductivity meter:	Mains operated 200/250V a.c.
Supply pressure:	0·7 kgf/cm^2 max.
Overall dimensions:	$27\times24\times51$ cm.
Weight:	7·5 kg net.
Inlet and outlet:	Nozzles for 12·5 mm i.d. flexible tubing.
With one cartridge C211	Each **£37·00** *m*

REPLACEMENT PART
DH-641 Cartridge, C211 ... ... Each **£17·50** *m*

DH-643

DEIONISER, *Elgastat,* **Model B113/B,** as DH-640 but export model and battery operated. With dry cell battery and one cartridge C211F ... Each **£45·00** *m*

REPLACEMENT PART
DH-636 Ion-exchange resin, C208, sufficient for five charges. For price see entry above.

DH-650

DEIONISER, *Raleigh,* **Model I.**

Ion-exchange charge:	Mixed bed, regenerative *in situ*
Mounting:	Bench.
Output:	70 to 850 litres tap water depending on hardness.
Flow rate:	40 litres/hr max.
Average effluent quality:	5 to 20×10^6 ohm/cm^3.
Effluent purity:	0·05 ppm silica; 0 ppm CO_2.
Effluent pH:	7.
Conductivity meter:	Mains operated 100/110 and 200/250V a.c.
Overall dimensions:	100 cm high × 9 cm dia.
Weight:	5 kg.
Inlet and outlet	For 10 mm i.d. flexible tubing. Each **£74·50** *mN*

REPLACEMENT PART
DH-652 Ion-exchange resin, single charge ... Each **£6·00** *mN*

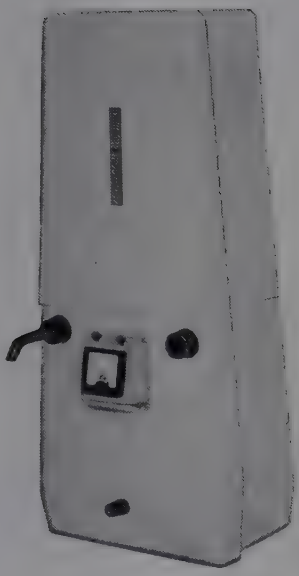
DH-630

DH-640

DH-650

Items on this page normally available from stock except those coded *N*.

DH-675



DH-690

DH-730

DH-675

DEIONISER, *Permutit,* **Mark 17.**

Cartridge:	Mixed bed. (See Note on p. 182 for regeneration).
Mounting:	Wall or bench.
Output:	110 to 1300 litres tap water depending on hardness.
Flow rate:	Up to 120 litre/hr.
Average effluent quality:	1×10⁶ ohm/cm³, BP quality.
Effluent purity:	0·05 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Conductivity meter:	Battery operated.
Supply pressure:	0·5 kgf/cm² to 3·5 kgf/cm².
Overall dimensions:	23×24×50 cm.
Weight:	8 kg net.
Inlet:	Hose and adapter for water tap.
Outlet:	Nozzle for free flow.

Supplied with dry cell battery and one cartridge.
Each **£26·00** *m*

REPLACEMENT PART
DH-677 Cartridge ... ... Each **£9·00** *m*

DH-690

DEIONISER, *Permutit,* **Mark 11.**

Cartridge:	Mixed bed. (See Note on p. 182 for regeneration).
Mounting:	Wall or bench.
Output:	200 to 3000 litres tap water depending on hardness.
Flow rate:	120 litres/hr.
Average effluent quality:	1×10⁶ ohm/cm³.
Effluent purity:	0·05 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Conductivity meter:	Battery operated.
Supply pressure:	0·5 kgf/cm² to 3·5 kgf/cm².
Overall dimensions:	28×21×70 cm.
Weight:	12·7 kg.
Inlet:	Hose and adapter for water tap.
Outlet:	Nozzle for free flow.

Supplied with dry cell battery and one cartridge.
Each **£36·00** *m*

REPLACEMENT PART
DH-692 Cartridge ... ... Each **£17·00** *m*

DH-730

DEIONISER, *Permutit,* **Mark 8H.**

Ion-exchange charge:	Twin column, regenerative *in situ,* 'Zeo-Karb' and weakly basic 'De-Acidite'.
Mounting:	Trolley.
Output:	700 to 9000 litres tap water depending on hardness.
Flow rate:	60 litres/hr.
Average effluent quality:	1×10³ ohm/cm³.
Effluent purity:	10 ppm silica; CO_2 variable dependent on alkalinity of tap water.
Effluent pH:	4 to 5.
Conductivity meter:	Battery operated.
Supply pressure:	0·5 kgf/cm² to 3·5 kgf/cm²
Overall dimensions:	150×100×42 cm.
Weight:	28 kg.
Inlet:	Hose and adapter for water tap.
Outlet:	Nozzle for free flow.

Supplied with dry cell battery and ion-exchange charge.
Each **£109·00** *m*

DH-735

DEIONISER, *Permutit,* **Mark 8F.** As DH-730 but with strongly basic 'De-Acidite' column.

Output:	210 to 2500 litres tap water depending on hardness.
Effluent purity:	0·2 ppm silica; 0 ppm CO_2.
Effluent pH:	8·5 to 9·5.

Supplied with dry cell battery and ion-exchange charge.
Each **£109·00** *mN*

Items on this page normally available from stock except those coded *N*.

***DR-570**

DISSECTING MICROSCOPE, *Olympus* Model DM-2, with interchangeable ×10 and ×20 achromatic lenses. The cast base carries a vertical column on which are mounted the rack and pinion focusing assembly and the working stage. This square stage 60×60 mm can be used with either the clear glass or the frosted glass plates supplied; it is fitted with slip-on hand rests and with slide clips. Illumination is provided by means of a fully adjustable plano-convex mirror. The lenses are held by a double jointed arm which allows examination of any part of the stage. Complete in wooden case with carrying handle.
Each **£13·85** *mS*

DR-580

DISSECTING MICROSCOPE, *Prior*, with interchangeable ×5 and ×10 doublet lenses. A heavy horseshoe foot carries a vertical column upon which the rack and pinion focusing assembly and the working stage are mounted. The stage has a central clear glass disk either side of which arm rests are fitted. The magnifying lens is held by a double jointed arm enabling examination of any part of the glass stage to be made. Transmitted illumination is provided by a movable mirror with opal glass reverse face ... ... Each **£20·10** *f*

DR-585

DISSECTING MICROSCOPE, *Prior*, as DR-580 but fitted with **wide field** aplanatic lenses ×5 and ×10.
Each **£23·25** *f*

ACCESSORY

DR-588	**Case,** with lock and key	Each	£3·75

As exclusive Distributors in the United Kingdom only for biological microscopes made in Japan by Olympus Optical Co. Ltd. we are unable to offer for sale outside this territory.

DR-570

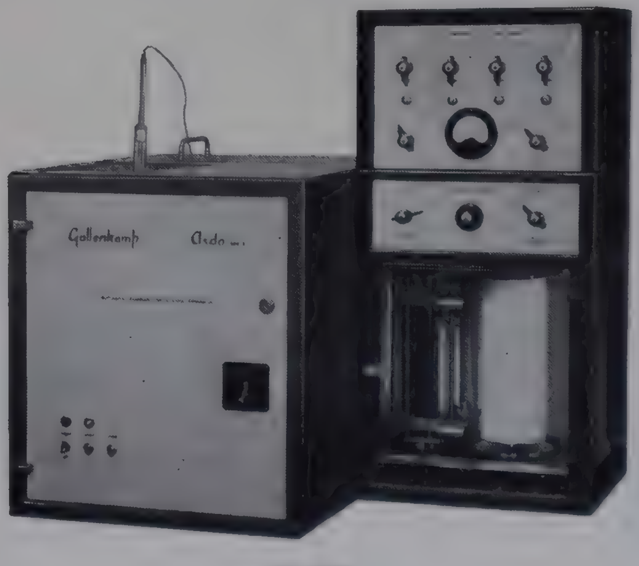
DR-580

Gallenkamp ASDA

AUTOMATIC STANDARD DISTILLATION APPARATUS

- **Routine testing of solvents, gasolines, aviation and motor fuels, etc.**
- **Suitable for standard test methods ASTM D86–IP 123, IP 195, ASTM D1078, DIN 51751 and DIN 51752**
- **Operator fatigue and personal errors eliminated**
- **Designed for continuous operation over extended periods**

For full details see PE-700 in List No. sequence.



PE-700

Items on this page coded *S* **normally available from stock.**

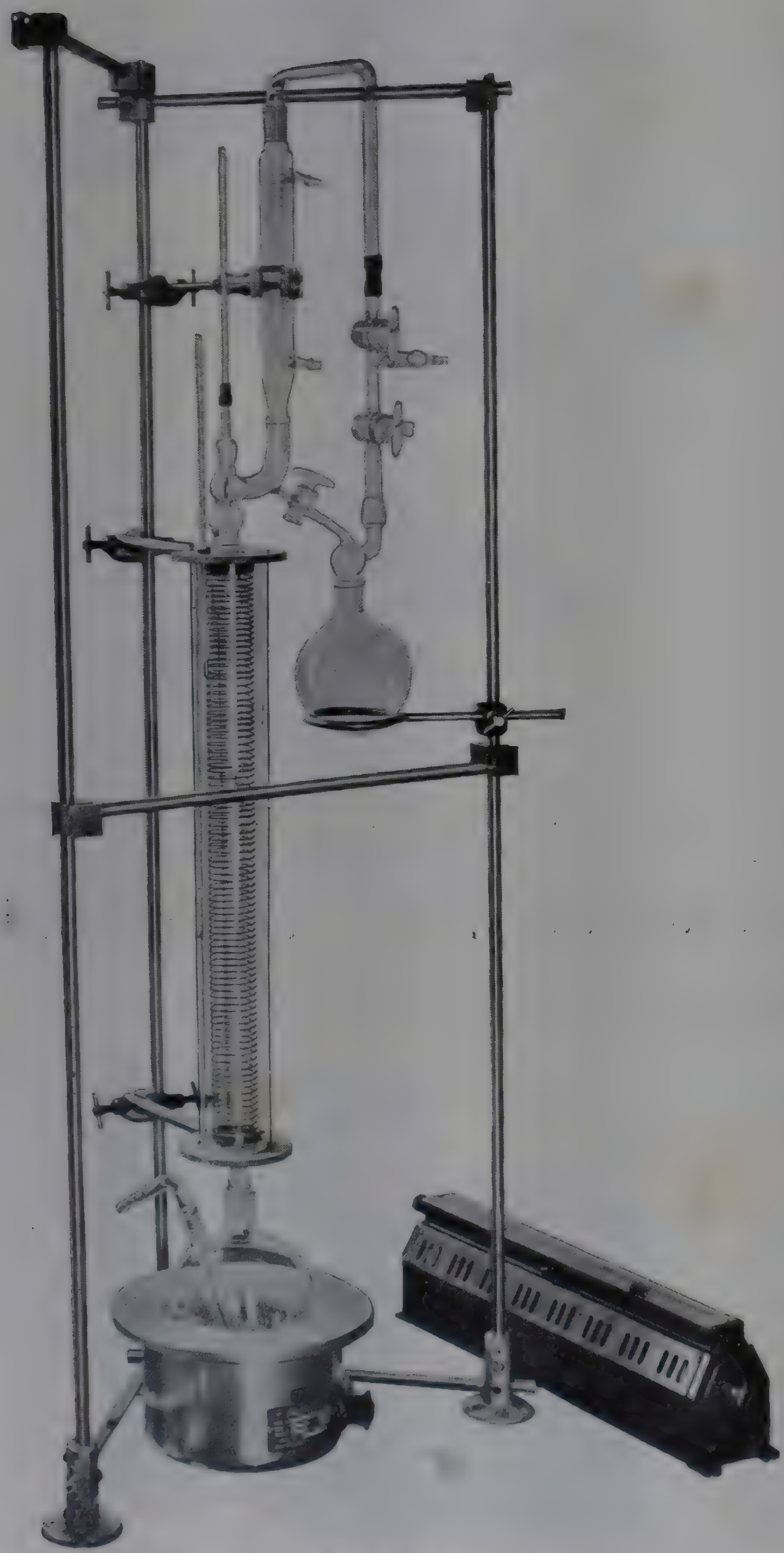
Gallenkamp FRACTIONAL DISTILLATION UNIT

A complete apparatus for the fractional distillation of liquids at atmospheric or reduced pressures.

Made of borosilicate glass, the apparatus is quickly and easily assembled, standard interchangeable joints being used throughout.

The column has a high efficiency packing of single and multi-turn glass helices and has a theoretical plate value of 12 to 15 plates (low HETP) with double-walled glass heater jacket wound with nickel-chromium tape, ensuring reasonably adiabatic conditions and permitting full view of the column during operations.

The stillhead DT-530 is of the simple total condensation type with variable take-off and reflux ratio control. Stillhead DT-540 can be substituted at extra cost.



DT-520 with DT-538 and HD-500

DT-520

FRACTIONAL DISTILLATION UNIT, *Gallenkamp*, comprising glassware listed below, a rheostat for adjusting the temperature of the heating jacket, one each thermometers TJ-100 and TJ-102, range −5 to 360°C, tap grease, unreactive material for waxing joints when operating at high temperatures, and instruction manual. For 200/250V a.c. single phase supplies... Each **£67·00** *b*

ACCESSORY

HD-500 **Heating mantles.** For prices see entry in List No. sequence.

REPLACEMENT PARTS

DT-524	**Air leak tube,** borosilicate glass, 14/23 cone.	Each	**£1·20**	*a*
DT-526	**Fractionating column,** borosilicate glass, 60 cm long, with 24/29 cone and socket	Each	**£2·40**	*a*
DT-528	**Support funnel,** for column backing material.	Each	**£0·50**	*a*
DT-529	**Heater jacket,** borosilicate glass, double-walled wound with nickel-chromium tape Overall length 53 cm	Each	**£9·00**	*a*
DT-530	**Stillhead,** borosilicate glass, total condensation, variable take-off pattern, with 24/29 cone ...	Each	**£8·30**	*a*
DT-536	**Calcium chloride tube,** borosilicate glass, with 14/23 socket	Each	**£1·10**	
DT-537	**Connecting piece,** borosilicate glass, for vacuum distillation, with 19/26 cone and 14/23 socket, one 3-way and one 1-way tap, rubber junction and vacuum take-off nozzle with 14/23 socket...	Each	**£8·30**	*a*

DT-562	**Helices, Fenske,** single turn, (1 pack required)	For prices see entries in List No. sequence.
DT-564	**Helices, Fenske,** multi-turn, (1 pack required)	
Q-FR 500/3S/1A.	**Distillation flask.** 500 ml, with 24/29 central neck and 14/23 side neck	
Q-FR 1L/3S/1A.	**Distillation flask,** as above but 1000 ml	
Q-SB 14	**Stopper,** 14/23 cone	
Q-C 3/12.	**Condenser,** spiral pattern, with 19/26 cone and socket	
TJ-100	**Thermometer,** range −5 to 360°C ...	
TJ-102	**Thermometer,** range −5 to 360°C ...	
TJ-325	**Thermometer adapter,** 14/23 cone, for TJ-102	
Q-FR 250/3S.	**Receiver flask,** 250 ml, with 24/29 neck	
Q-FR 500/3S.	**Receiver flask,** as above but 500 ml	
Q-MF 23/2.	**Calcium chloride tube,** with 19/26 cone	

DT-538

SCAFFOLDING SET, *Gallenkamp*, comprising rods, connectors, feet, clamps, bossheads, rings and fixing screws to form a three sided rigid support framework 120 cm high suitable for DT-520 ... Set **£8·50** *b*

All items on this page normally available from stock.

Gallenkamp STILLHEADS

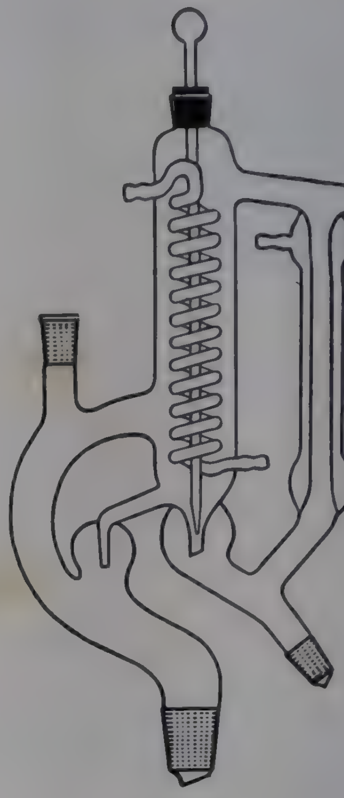
DT-540

STILLHEAD, *Gallenkamp*, for use with DT-520 in place of DT-530. This is an efficient total condensation variable take-off stillhead embodying many desirable features and suitable for most general laboratory fractionating requirements. Made from borosilicate glass, the stillhead is simple to operate and easy to clean. The reflux ratio is controlled by a tapered metal rod which fits into a glass socket. The rod has a fine thread to adjust its position and extends through a vacuum seal. There is no risk of contamination of the distillate by grease. The liquid hold up is very small. The apparatus is suitable for use at atmospheric and reduced pressures. The standard model is fitted with a 24/29 cone to fit the column, a 19/26 cone for the take-off and a 14/23 socket for the thermometer adapter ... ... Each **£22·00** *a*

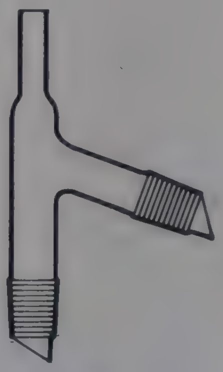
DT-556

STILLHEAD, (AG) small pattern for semi-micro preparation apparatus. With two cones 14/15 and thermometer sleeve ... ... Ten **£9·20** Each **£1·02** *a*

SPLASH HEADS, see NR-200, NR-204 in List No. sequence.



DT-540



DT-556

COLUMN FILLINGS

DT-560

RINGS, Rashig, glass, approx. 5 mm dia. × 5 mm long. In pack containing minimum of 250 g. Filling capacity approx. 300 ml ... 10 packs **£9·20** Pack **£1·02** *a*

DT-562

HELICES, Fenske, single turn, 4 mm dia., made from 0·5 mm dia. borosilicate glass rod. In pack containing minimum of 50 g. Filling capacity approx. 100 ml.
5 packs **£5·50** Pack **£1·20** *m*

DT-564

HELICES, Fenske, multi turn, 4 mm dia., made from 0·5 mm dia. borosilicate glass rod. In pack containing minimum of 50 g. Filling capacity approx. 150 ml.
5 packs **£6·00** Pack **£1·30** *m*

COLUMNS

DT-566

FRACTIONATING COLUMNS, (AG), **Young,** rod and disk pattern, **borosilicate glass.**

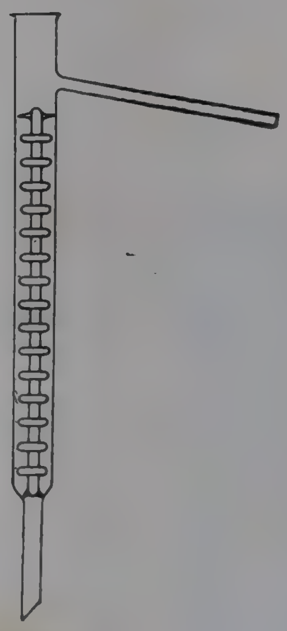
No. of disks	15	20	
Ten	£13·60	17·00	*a*
Each	£ 1·55	1·90	

DT-568

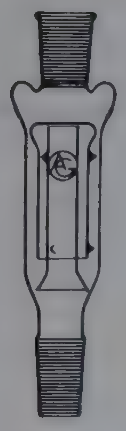
FRACTIONATING COLUMN, Young and Thomas pattern, (AG), **borosilicate glass,** consisting of single section with 19/26 cone and socket. Multi-section columns may be constructed as required ... Each **£1·65** *a*

DT-576

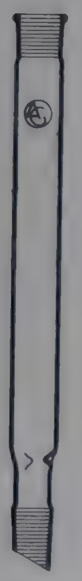
FRACTIONATING COLUMN, (AG) with 14/15 socket and 14/15 drip end cone joints. Effective length 110 mm, internal dia. 14 mm with three indents at the lower end to support packing. Borosilicate glass. Approximate capacity for packing materials, 25 ml.
Ten **£7·00** Each **£0·78** *a*



DT-566



DT-568



DT-576

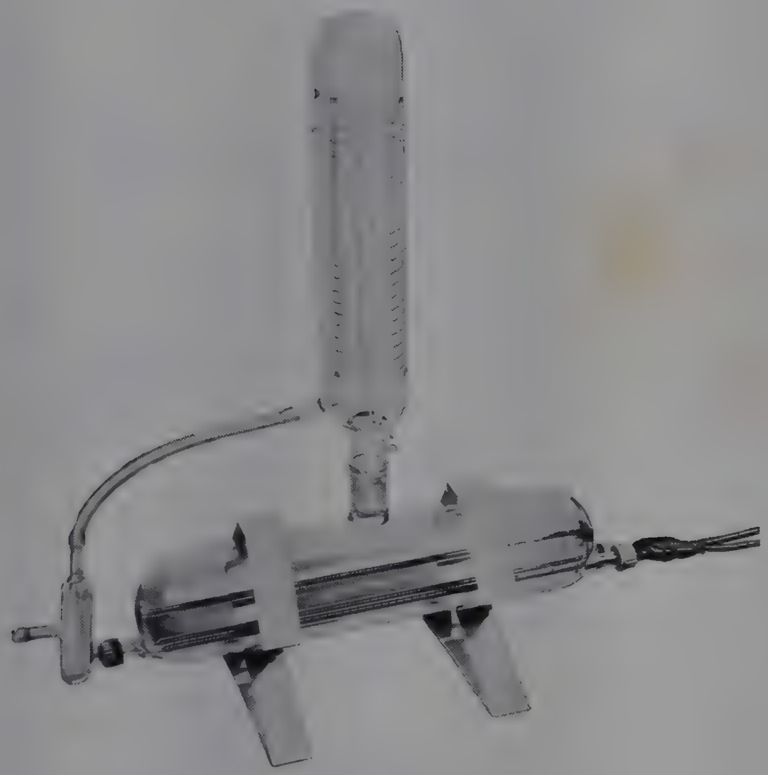
Gallenkamp

KJELDAHL DIGESTION AND DISTILLATION ASSEMBLIES see NR-010 et seq. in List No. sequence.

DEAN AND STARK DISTILLATION ASSEMBLIES see WJ-130 et seq. in List No. sequence.

All items on this page normally available from stock.

ALL-GLASS WATER STILLS



DT-584

ELECTRICALLY HEATED

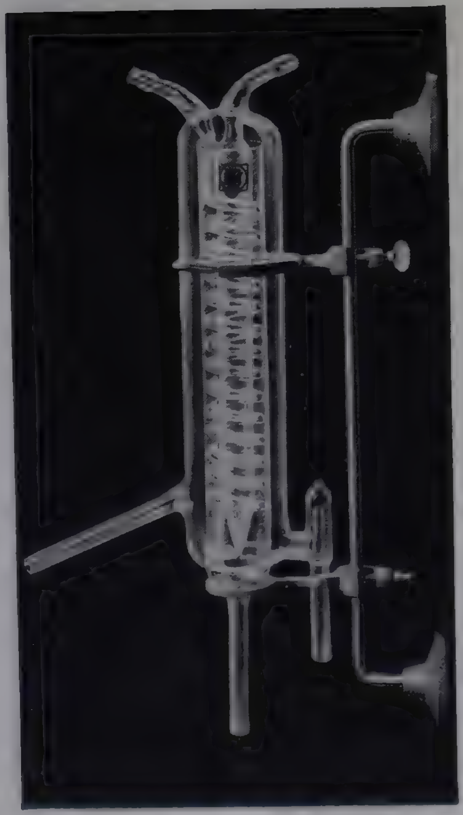
- Output approximately 4 litres/hour
- Distillate quality—0·5 to 1×10^6 ohms/cm^3
- Minimum cooling water usage and high efficiency achieved by returning condenser water to still body
- Automatic cut-out operates if water supply fails
- Preset constant level device
- Requires only 80×25 cm bench space
- Silica sheathed heating element

DT-584

STILL, glass and ptfe, *Quickfit* **14WSC,** output approximately 4 litres/h of water having an average quality between 0·5 and 1×10^6 ohms/cm^3. Heating is by means of a 3 kW silica sheathed immersion element. With preset constant level device and automatic cut-out. For 190/250V a.c. single phase supplies. Includes two support brackets for wall or bench mounting ... Each **£44·00** *m*

REPLACEMENT PART

DT-586 Heater, 3 kW, silica sheathed. For 190/250V a.c. supplies. Each £8·50 *m*



DT-590 with DT-592

STRIP ACTION

DT-590

STILL, strip action, borosilicate glass, for producing distilled water from steam mains, output 4·5 litres/h. Steam enters at the bottom and is fractionated in the air-cooled outer jacket, the steam being stripped of dirt, oil, etc., by the descending water fraction. The clean steam passes over an efficient spiral water condenser and the distilled water emerges at the bottom, while the fraction containing the dirt leaves through a trap. If the mains steam is exceptionally clean, the air jacket can be lagged to reduce the proportion of steam fractionated out, and thus increase the distilled water output. The still does not fur up and its thermal efficiency is high because cold water does not have to be boiled. ... Each **£10·25** *f*

In the U.K. this still is supplied packed in a returnable crate charged at £5 which is refunded on return in good condition.

ACCESSORY

DT-592 Bracket, for wall mounting Each £3·75

All items on this page normally available from stock.

MANESTY WATER STILLS

DT-602

DT-612
and
DT-616

List No.	Type	Output litres/h	Consumption/h	Height cm	Type of finish	Each	
						£	
DT-602	Destil electric	1·1	1 kW	54	Standard	**25·20**	*f*
DT-612	OB electric	1·7	1·5 kW	65	Standard	**36·50**	*f*
DT-613	OB electric	1·7	1·5 kW	65	Vitreous	**42·45**	*f*
DT-616	OOB electric	3·8 to 4·5	3 kW	75	Standard	**54·80**	*f*
DT-617	OOB electric	3·8 to 4·5	3 kW	75	Vitreous	**62·50**	*f*
DT-619	S45 electric	3·8 to 4·5	3 kW	75	Stainless steel	**78·40**	*f*
DT-620	OOO steam	9	—	115	Standard	**89·60**	*fN*
DT-622	1B steam	18	—	105	Standard	**166·00**	*fN*
DT-624	2B steam	36	—	135	Standard	**197·00**	*fN*

**Electric models are available for 100/110, 200/210 or 220/240V supplies.
When ordering please state voltage and nature of supply.**

All models of this range of automatic water stills for wall mounting have an identical method of operation. Water enters at the base of the condenser, circulates round the condenser tube and fills the boiling chamber to a height controlled by the overflow chamber. The water is pre-heated almost to boiling point by condensing steam before entering the boiling chamber, and dissolved gases are liberated and expelled.

DESTIL MODEL

This low capacity model incorporates a toughened glass inner baffle and a removable condenser tube fitted below the metal lid.

OB and OOB MODELS

These are medium capacity stills available in the standard finish of heat resisting aluminium paint or alternatively with an attractive, corrosion resisting finish where all cast iron parts are vitreous enamelled and the other external parts are chromium plated. Other parts are common and include a baffle cup, a lid of toughened glass, a condenser tube and an inner baffle of stainless steel.

S45 MODEL

The standard finish for this model is polished stainless steel and all operating parts are stainless steel or borosilicate glass. This model is not available for 100/110V except with a 1500W element producing half the output.

STEAM MODELS

These large capacity models will operate on steam pressures between 25 and 60 lbf/in², though pressures of 30 to 40 lbf/in² are ideal. Average consumption is 3 lb steam at 40 lbf/in² for each 1 litre distilled water.

REPLACEMENT PARTS

DT-630	**Heating element,** 1000W, for DT-602, with safety device	Each	**£3·00**	*f*
DT-632	**Heating element,** 1500W, for DT-612 to DT-617, with safety device	Each	**£3·00**	*f*

NOTE: Two elements, DT-632, required for stills DT-616 and DT-617. One element is used in the 100/110V range for still DT-619.

DT-635	**Heating element,** 3000W, for DT-619, when used on 200/210 or 220/240 volts, with safety device.	Each	**£6·15**	*f*

When ordering above elements please state voltage and frequency of supply.

DT-640	**Baffle cup,** toughened glass, for DT-602 to DT-620 inclusive	Each	**£0·60**	
DT-644	**Lid,** toughened glass, for DT-612 to DT-624 inclusive.	Each	**£2·30**	*f*

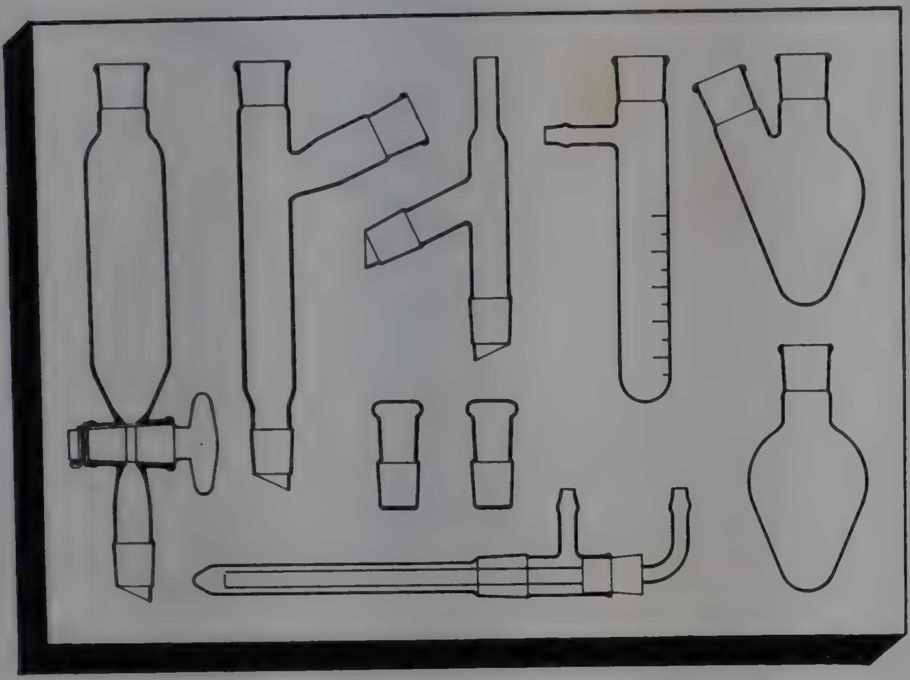
Items on this page normally available from stock except those coded *N.*

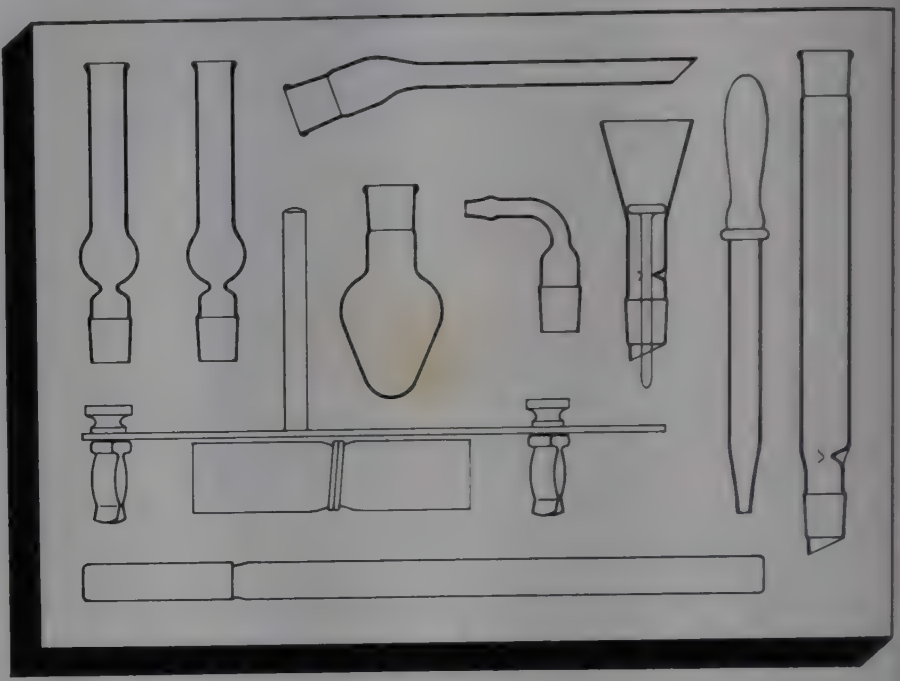
SMALL SCALE PREPARATIVE SETS

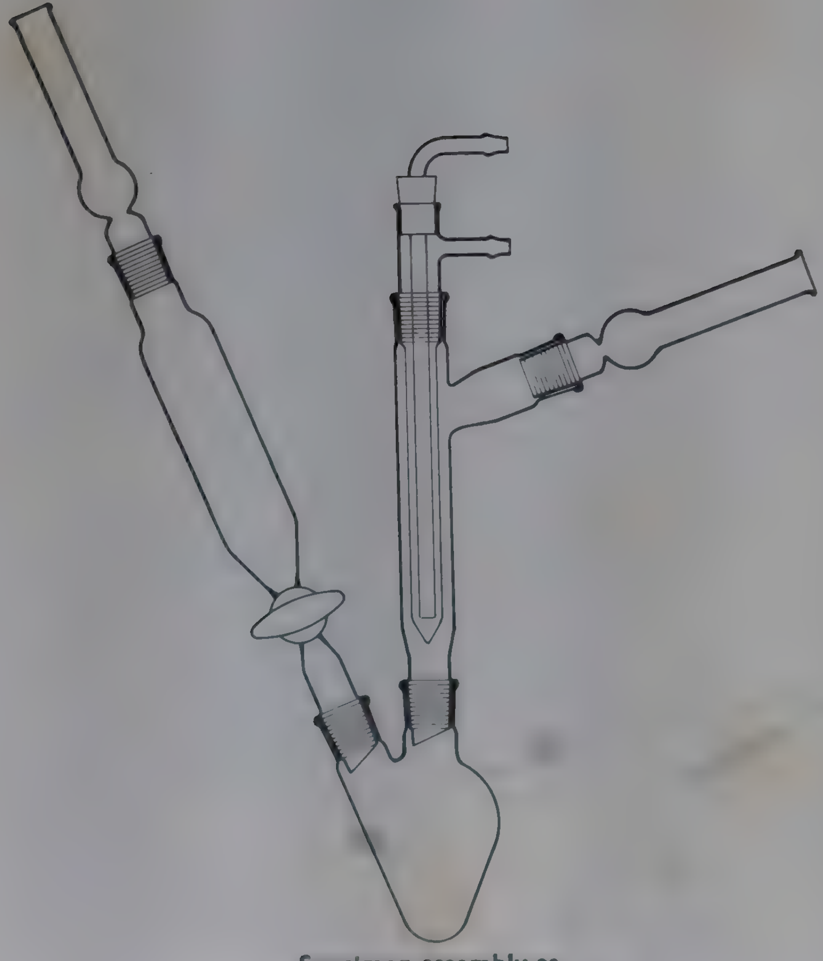
FOR EDUCATIONAL AND INDUSTRIAL ORGANIC CHEMISTRY

AG Regd.

Teaching manual by J. P. Pearce, B.Sc., A.R.I.C. and F. E. Haddon, B.Sc., A.R.I.C.,
Science Department, Croydon Technical College







Specimen assembly as used for a Grignard reaction

- **Sets**

  The **comprehensive set** retains all the best features of earlier AG sets with design improvements and additional components. It is supplied with an informative teaching manual of techniques and experiments.

  The **abridged set** comprises the more commonly used components only and does not include the teaching manual. It can be used for many experiments and also to supplement the comprehensive set when this is required for two or more simultaneous experiments.

  Both sets are packed in preformed storage trays in stout cartons.

- **Teaching manual**

  The manual by J. P. Pearce and F. E. Haddon is designed to match the developing knowledge of organic chemistry theory as students proceed through 'A' level or O.N.C. courses. A few examples of a more advanced nature demonstrate the suitability of the apparatus for H.N.C. and degree courses.

- **Safety**

  The manual places considerable emphasis on the safety aspect in relation to toxicity, flammability and explosion hazards, all of which are minimised by the careful choice of chemicals used to illustrate the various reactions and the small quantities required.

- **Versatility**

  They provide a maximum number of assemblies at minimum cost. All components have 14/15 ground joints.

  The assemblies are practically self supporting and the comprehensive set includes a clamp adaptable to all assemblies.

- **Economy**

  The small scale saves space, reduces time taken in setting up and reduces costs due to the smaller quantities of reagents required. This saving is most significant with expensive reagents.

SMALL SCALE PREPARATIVE SETS

Regd.

COMPONENTS

All glass items in the list are made of borosilicate glass except the dropping pipette and thermometer.

For details of unpriced components see entries in List No. sequence.

FJ-195	**Flask, pear shaped,** socket 14/15. Capacity 30 ml.			
FJ-196	**Flask, pear shaped,** two neck, sockets 14/15. Capacity 30 ml.			
DT-556	**Stillhead,** with plain thermometer tubulure and two cones 14/15.			
DT-742	**Condenser, 'cold finger',** cone 14/15.	Each	£0·70	a
DT-744	**Condenser jacket, with side arm,** and two sockets and one cone 14/15	Each	£0·90	a
TF-422	**Receiver, graduated, with side arm,** borosilicate glass, socket 14/15. Capacity 10 ml, subdivided in 1 ml.			
FP-587	**Funnel,** cylindrical separating, with 14/15 cone and socket. Capacity 30 ml.			
SU-520	**Stopper,** cone 14/15.			

The abridged set contains one each of the above 8 items.

FJ-195	**Flask, pear shaped,** socket 14/15. Capacity 10 ml.			
DT-746	**Condenser adapter** with 14/15 socket.	Each	£0·95	a
DT-752	**Vacuum adapter,** 14/15 cone	Each	£0·60	a
DT-576	**Fractionating column** with 14/15 cone and socket. Effective dimensions 110 mm × 14 mm dia. Packing capacity approximately 20 ml.			
DT-757	**Rashig rings** for packing DT-576. In pack containing approximately 25 ml.	Pack	£0·15	a
AB-620	**Absorption tube** with 14/15 cone.			
FP-290	**Funnel,** Willstätter filter, with 14/15 cone. Capacity approximately 5 ml.			
PM-580	**Dropping pipette,** capacity approximately 4 ml.			
TJ-058	**Thermometer,** 250°C, subdivided in 2degC.			
SM-685	**Clamp,** adjustable, for supporting assemblies on a retort stand.			

The comprehensive set contains two each AB-620 and SU-520, one each of all 16 other items above and one copy of the teaching manual.

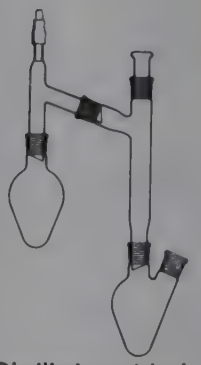
DT-760

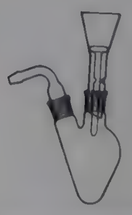
PREPARATIVE SET, Ⓐ, **comprehensive** small scale set of the 20 components listed above. With teaching manual ... ... Set **£13·75** a

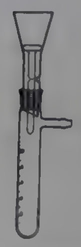
DT-765

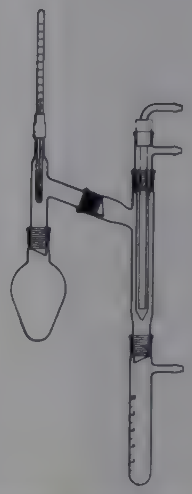
PREPARATIVE SET, Ⓐ, **abridged** small scale set of 8 basic components listed above. Without manual. Set **£6·75** a

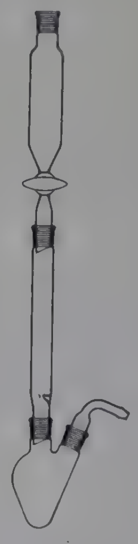
Typical assemblies

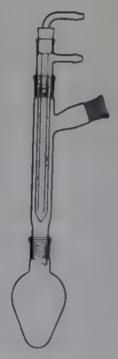

Distillation with air condenser

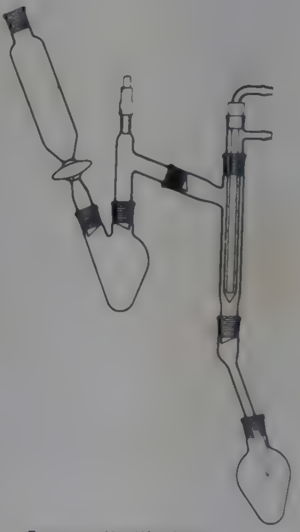

Vacuum filtration

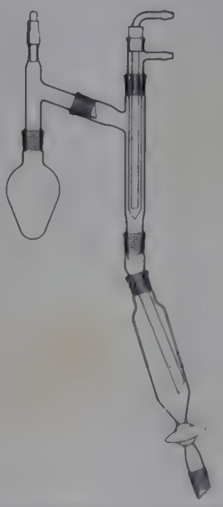

Vacuum filtration

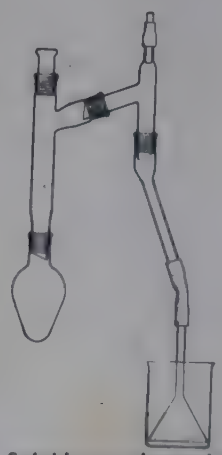

Distillation with water condenser

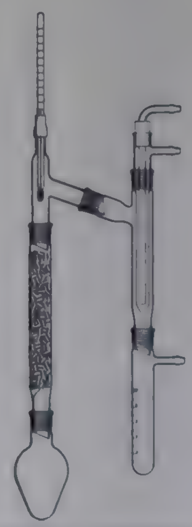

Column chromatography


Reflux distillation with water condenser


Steam distillation


Distillation of a volatile product


Soluble gas absorption

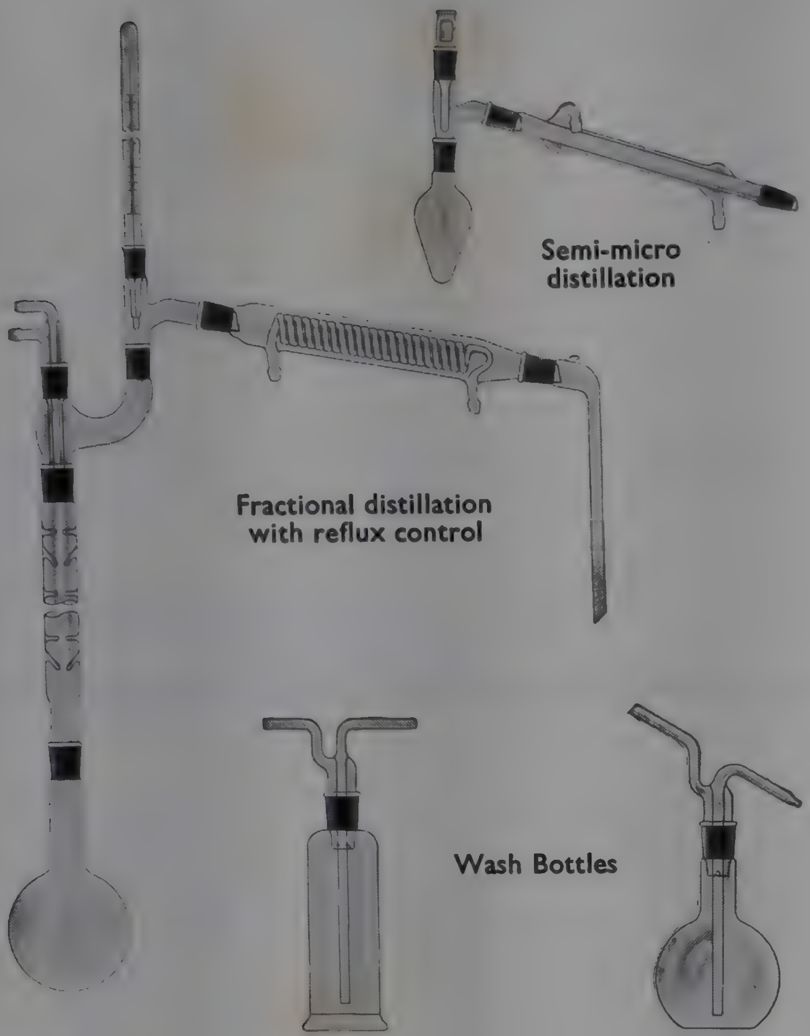

Fractional distillation

All items on this page normally available from stock.

QUICKFIT SETS

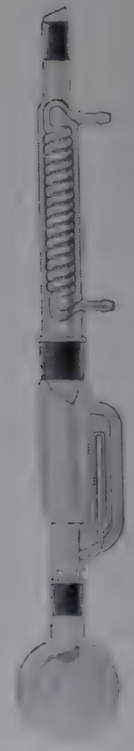
For Distillation and Preparative Chemistry

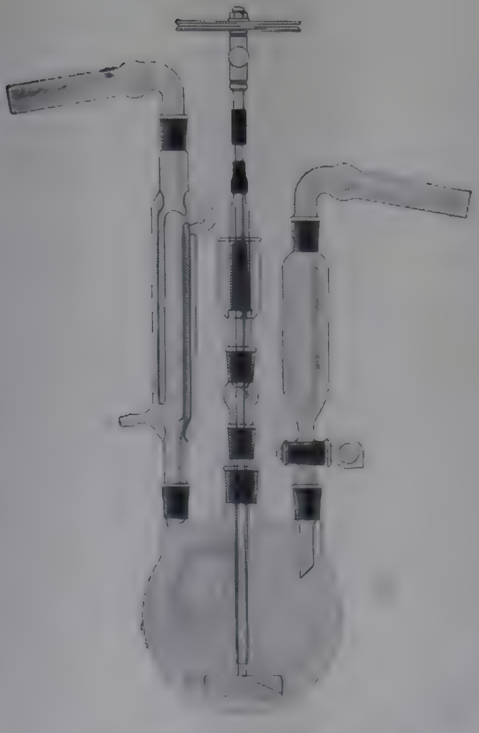
STARTING AND INTERMEDIATE SETS for quantities from 30 g to 1 kg.

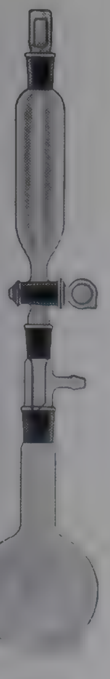

Semi-micro distillation

Fractional distillation with reflux control

Wash Bottles


Extraction


Reflux with stirring and addition of reactants


Gas evolution

DT-800

QUICKFIT SET 34 BU. A starting set of 16 components which include the necessary equipment for a wide range of preparations up to 150 g scale. In box 48 × 38 × 11 cm with plastics storage tray.
Six **£70·20** Each **£13·00** *m*

DT-802

QUICKFIT SET 34 X. An extension set of 10 components which convert 34 BU (DT-800) into 33 BU (DT-804). In box 48 × 38 × 18 cm.
Six **£59·40** Each **£11·00** *m*

DT-804

QUICKFIT SET 33 BU. Intermediate set of 26 components of wider scope than 34 BU (DT-800) up to 300 g scale and provides for stirring and steam distillation. In two boxes as detailed for DT-800 and DT-802.
Six **£129·60** Each **£24·00** *m*

DT-806

QUICKFIT SET 33 X. An extension set of 20 components which convert 33 BU (DT-804) into 32 BU (DT-808). In two boxes 46 × 38 × 11 cm and 46 × 38 × 18 cm respectively ... ... Six **£156·60** Each **£29·00** *m*

DT-808

QUICKFIT SET 32 BU. Intermediate set of 46 components providing a comprehensive range of equipment for organic chemistry up to 1 kg scale. Includes 3 neck flasks, fractionating column, double surface condenser and ground sleeve stirrer. In four boxes as detailed for DT-804 and DT-806 ... Six **£286·20** Each **£53·00** *m*

DT-810

QUICKFIT SET 32 X. An extension set of 53 components which convert 32 BU (DT-808) into 30 BU (DT-812). In five boxes, three of them 46 × 38 × 11 cm and two 38 × 23 × 7 cm ... Six **£326·70** Each **£60·50** *m*

DT-812

QUICKFIT SET 30 BU. A comprehensive multi-joint set of 99 components with which a very wide range of organic reactions and preparations can be carried out on any scale from 30 g to 1 kg. In nine boxes as detailed for DT-800, DT-802, DT-806 and DT-810.
Six **£612·90** Each **£113·50** *m*

All items on this page normally available from stock.

QUICKFIT SETS

For Distillation and Preparative Chemistry

14/23 ONE JOINT SETS

DT-830

QUICKFIT SET 29 BU. A basic set of 5 components with 14/23 joints designed for elementary organic chemistry in schools on a 30 g scale. In box 30×18×12 cm.

Six **£20·22** Each **£3·75** *m*

DT-832

QUICKFIT SET 29 X. An extension set of 3 components which convert 29 BU (DT-830) into 27 BU (DT-834). In cardboard box.

Six **£17·58** Each **£3·25** *m*

DT-834

QUICKFIT SET 27 BU. An intermediate set of 8 components with 14/23 joints for student use. In box 38×23×7 cm. ... ... Six **£36·42** Each **£6·75** *m*

DT-836

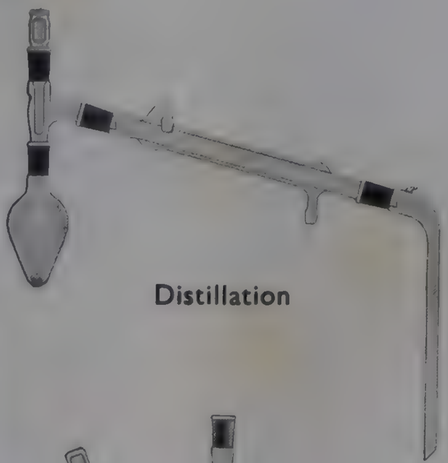
QUICKFIT SET 27 X. An extension set of 8 components which convert 27 BU (DT-834) into 23 BU (DT-838). In box 38×23×7 cm.

Six **£27·00** Each **£5·00** *m*

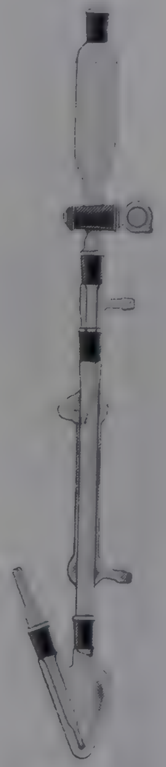
DT-838

QUICKFIT SET 23 BU. An advanced students set of 15 components with 14/23 joints and a plastics drawing stencil. For small scale preparations up to 30 g scale. In two boxes each 38×23×7 cm.

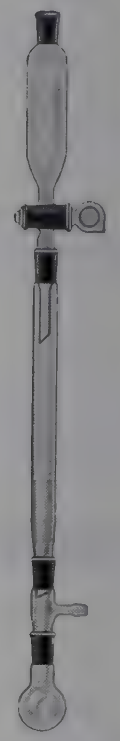
Six **£63·42** Each **£11·75** *m*



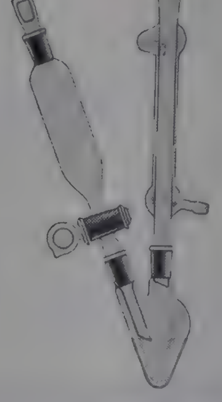
Distillation



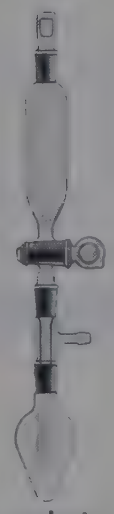
Reflux with gas and liquid inlets



Chromatography



Reflux with liquid addition



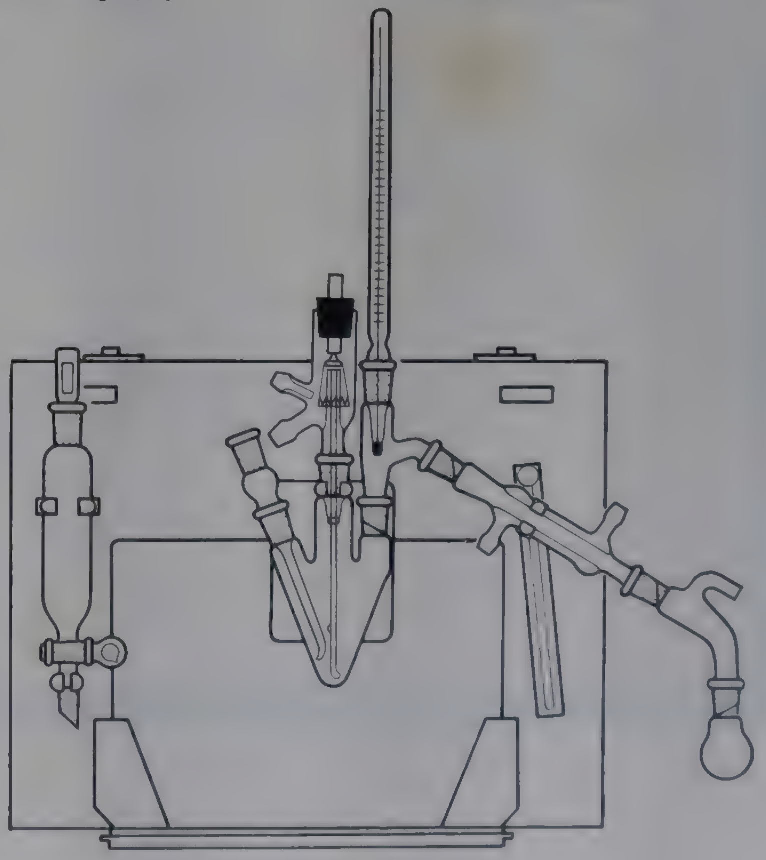
Gas evolution

SEMI-MICRO LABORATORY

DT-870

QUICKFIT PORTABLE LABORATORY 10 BU. Comprising 22 components with 10/19 joints and a plastics drawing stencil in dual purpose box 28×23×7 cm. The lower part of the box serves for storage of components while the two-piece lid easily converts to a stand on which assemblies can be mounted in plastics coated spring clips. The working surface is plastics coated and flame deflector is fitted. More than 25 assemblies can be used which will cover organic chemistry up to degree level for educational purposes. The laboratory has also proved popular in many industrial laboratories on account of economy in initial cost, in space and in reagents.

Six **£129·60** Each **£24·00** *m*



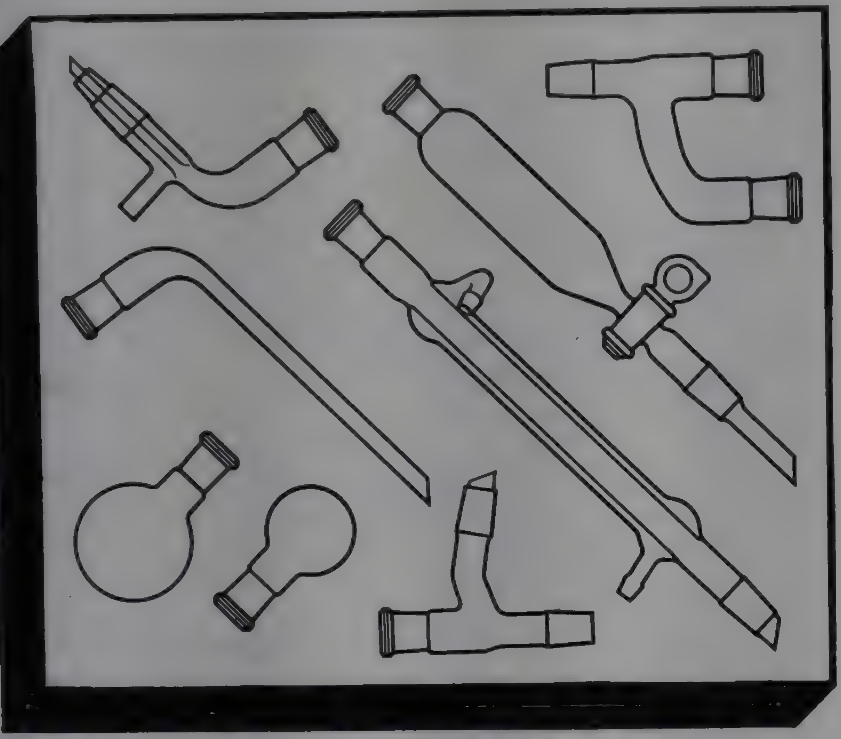
DT-870

All items on this page normally available from stock.

CLEARFIT ONE JOINT SETS

Clearfit conical glass joints are manufactured by a process which achieves a fine precision fit without the necessity of grinding. This provides the following advantages:

- Greater strength
- Reduced leakage and creep
- Less contamination, easier cleaning
- Greasing rarely necessary
- Reduced seizing or sticking
- Reduced alkali attack
- Transparent for internal observation
- Interchangeable with ground joints



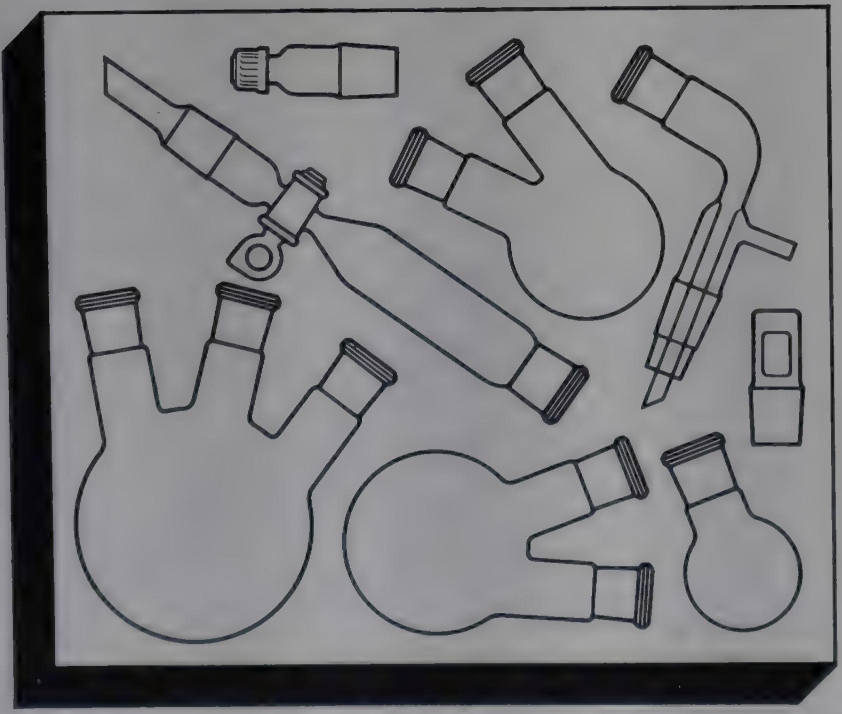
DT-900 (Box I)

DT-900

CLEARFIT 19/26 ONE JOINT SET KA2/II comprising components with 19/26 joints listed below, supplied in two storage boxes, each 47 × 39 × 13·5 cm fitted with moulded polystyrene trays. Total weight 3·5 kg.

Box I		**Box 2**	
Q-KC1/12	Condenser.	Q-KFR250/2S/22A	Flask.
Q-KD1/22	Funnel.	Q-KFR500/2S/22A	Flask.
Q-KFR50/2S	Flask.	Q-KSB19	2 stoppers.
Q-KFR100/2S	Flask.	Q-KST52/13	2 adapters.
Q-KMA1/2	Adapter	Q-KST20/2	Gland.
Q-KRA1/12	Adapter.	Q-MF5	Inlet tube.
Q-KRA3/22	Adapter.	Q-MU31/1	Thermometer.
Q-KSH4/2	Stillhead.	Q-MU31/2	Thermometer.
		Q-ST6/	Stirrer.
		Q-ST7/2	Stirrer.

Six £128·22 Each £23·75 *m*



DT-920 (Box 2)

DT-920

CLEARFIT 29/32 ONE JOINT SET KA4/II comprising components with 29/32 joints listed below, supplied in two storage boxes, each 47 × 39 × 15·5 cm fitted with moulded polystyrenet rays. Total weight 4·4 kg.

Box I		**Box 2**	
Q-KC1/44/30	Condenser.	Q-KD1/2/44	Funnel.
Q-KMA1/44	Adapter.	Q-KFR100/4S	Flask.
Q-KRA1/14	Adapter.	Q-KFR250/4S/4A	Flask.
Q-KSB29	Stopper.	Q-KFR500/4S/4A	Flask.
Q-KSH4/444	Stillhead.	Q-KFR1L/4S/44A	Flask.
Q-KST2/44/7	Stirrer.	Q-KRA3/44	Adapter.
Q-KST54/18	Adapter.	Q-KSB29	Stopper.
Q-KST20/4/6	Gland.	Q-KST54/18	Adapter.
Q-ST6/7	Stirrer.		
Q-ST7/3	Stirrer.		

Six £149·40 Each £27·67 *m*

All items on this page normally available from stock.

DRAINING BOARDS
see FURNITURE
DRECHSEL BOTTLES
see GAS WASHING
DRILLS see TOOLS
DROPPING BOTTLES
see BOTTLES
DROPPING FUNNELS
see FUNNELS
DRY BOXES see MANIPULATOR BOXES
DRYING, ovens see OVENS
DRYING, towers and tubes
see ABSORPTION APPARATUS

DUST EXAMINATION
Hexhlet
Cascade impactor
Thermal precipitator
} We shall be pleased to supply detailed catalogues and quotations on application for all apparatus for dust examination.
Andreasen pipette
Sedimentation balance
} see PARTICLE SIZE
Dust and moisture estimation apparatus
see GAS SAMPLING
EBULLIOMETERS see MOLECULAR WEIGHT

ELECTRICAL APPARATUS

Section Index

This section is divided into three groups as shown below. The fourth list shows those items which will be found in other parts of the catalogue.

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Terminal clips 205
Terminations set 205
Test probes 205
Test prod 204
Wire and cables 206

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Power controllers... ... ... 207/8
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Low voltage supply unit 211
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Moving iron meters 212
Multirange meters 213
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Resistance boxes 216
Resistance bridges 215
Standard cell 216
Strip chart recorders 218
Voltage reference battery 216

OTHER ELECTRICAL ITEMS

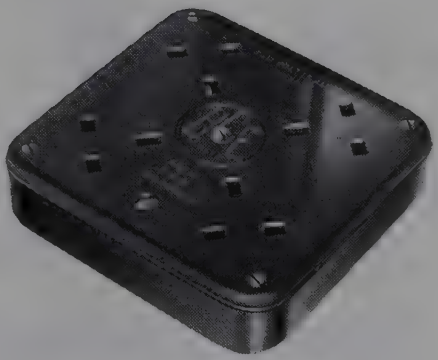
Other items of electrical equipment are listed in this catalogue under the following headings:

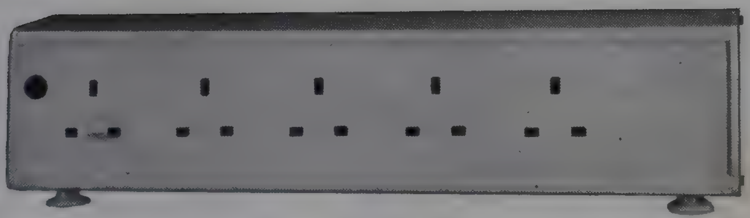
- Batteries
- Battery chargers
- Electrochemical apparatus
- Heaters
- Lubricants
- Motors
- Thermoregulators
- Tools

EB-110

EB-130

EB-140


EB-145


EB-150

EB-160

EB-165

EB-180

ACCESSORIES FOR MAINS ELECTRICITY SUPPLIES

EB-110

PLUG, 13A 3-pin to BS 1363. Moulded plastics. Each **£0·30** *m*

EB-124

FUSES, cartridge, to BS 1362, $1\times\frac{1}{4}$ in dia. for plugs EB-110. Available capacities, 2, 5, 10 and 13A. In packs of 10 ... ... 10 packs **£3·80** Pack **£0·44** *m*

When ordering please state fuse capacity.

EB-130

ADAPTER, 13A 3-pin, with twin 13A shuttered socket outlets. For plugs and sockets to BS 1363. Moulded bakelite ... ... Each **£0·50** *m*

EB-140

SOCKET, 13A 3-pin. Rubber clad ... Each **£0·40** *m*

EB-145

MULTIPLE SOCKET OUTLET, with four 13A sockets to BS 1363 housed in a robust neoprene rubber case. Suitable for floor, bench or wall mounting. With integral indicator lamp ... ... Each **£4·50** *m*

EB-150

MULTIPLE SOCKET OUTLET, with five 13A sockets to BS 1363 housed in a rigid PVC and earthed aluminium case for standing on bench. The micro circuit breaker will withstand a momentary surge in excess of 60A but trips on extended overload before the 13A fuse blows. The indicator lamp shows when the circuit is live and the unit complies with IEE regulations ... ... Each **£6·25** *m*

EB-160

CONNECTOR, snap-action. A very useful device for making temporary connections of electrical apparatus to mains. The spring loaded terminals have a large contact area and provide a firm grip and adequate electrical protection. They are colour coded, red, green and black. A double pole on/off switch with fuse EB-124 forms part of the cover and ensures that accidental contact with live terminals cannot be made when the cover is open. Supplied without cable ... ... Each **£2·33** *m*

EB-165

TERMINAL STRIP, 5A, 12-way moulded flexible plastics. Can be cut into smaller units as required.
Ten **£2·60** Each **£0·32** *m*

EB-180

TEST PROD, with neon indicator lamp, safety resistor and two test prods. It will indicate polarity, leakage, short circuits, etc. in a.c. and d.c. circuits. Completely enclosed in plastics moulded cover.
Ten **£3·20** Each **£0·38** *m*

All items on this page normally available from stock.

EB-220

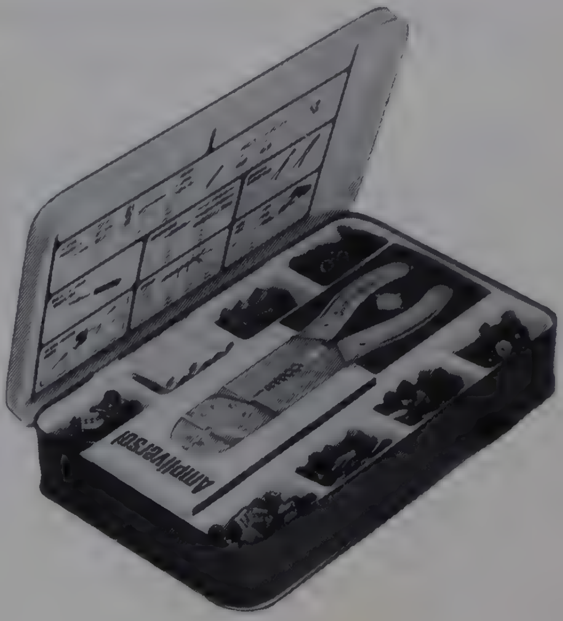
ELECTRICAL TERMINATIONS SET, *Ampliversal*, comprising 25 each of eight types of insulated wire connectors and terminations which may be quickly fitted to wire using the crimping tool provided.
The terminations include rings of 0 and 4 BA sizes, spades of 2 and 4 BA sizes, wire pins and push-on receptacles. These and the connectors are suitable for wires of up to 10 or 15 amperes capacity according to type. The tool is a combination hand tool for cutting wire, stripping insulation, crimping terminations, stud size gauging and BA screw cropping. Packed in a strong metal box with moulded plastics storage compartments. Each **£7·60** *m*

REPLACEMENT PARTS

EB-226	**Butt connectors,** for wires of 23 to 17 SWG.	Pack of 50	**£1·47**	*m*
EB-227	**Butt connectors,** for wire of 18 to 16 SWG.	Pack of 50	**£1·47**	*m*
EB-231	**Push-on receptacles** to fit ¼ in wide blades, for wires of 23 to 17 SWG	Pack of 50	**£2·17**	*m*
EB-235	**Ring terminations,** 0 BA fitting for wires of 18 to 16 SWG	Pack of 50	**£1·45**	*m*
EB-236	**Ring terminations,** 4 BA fitting, for wires of 18 to 16 SWG	Pack of 50	**£1·27**	*m*
EB-241	**Spade terminations,** 2 BA fitting, for wires of 23 to 17 SWG	Pack of 50	**£1·27**	*m*
EB-242	**Spade terminations,** 4 BA fitting, for wires of 23 to 17 SWG	Pack of 50	**£1·27**	*m*
EB-247	**Wire pins,** for wires of 23 to 17 SWG.	Pack of 50	**£1·05**	*m*

METRIC DIMENSIONS of BA and SWG sizes

Size	Dia. (mm)
0 BA	6·0
2 BA	4·7
4 BA	3·6
23 SWG	0·61
18 SWG	1·22
17 SWG	1·42
16 SWG	1·63



EB-220

EB-300

CABLES, 3-core, flexible, rubber insulated with tough rubber outer sheath. Core insulations coloured brown, blue and green/yellow.

Current rating	3	6	13A	
Wire specification	16/0·2	24/0·2	30/0·25 mm	
10 metres	**£0·90**	**1·35**	**1·50**	c
Metre	**£0·16**	**0·20**	**0·22**	

LUBRICANTS, for electrical contacts	see LX-260/263/265
PLIERS	see TT-250/254/256
SCREWDRIVERS, electricians	see TT-340
SOLDERING IRONS	see TT-420/430/440
TOOL KIT, instruments and electronics	see TT-600

Full details of the above items will be found in List No. sequence.

GENERAL PURPOSE ACCESSORIES

EB-340

PLUGS, banana, 4 mm, stackable. Supplied in pairs, one red, one black ... ... Pair **£0·30** c

EB-340

***EB-342**

TEST PROBES, flexible with press-button operated retractable ends which may be clipped firmly to wires or tags under test. With socket for 4 mm banana plug, and grub screw fixing for lead. Length 100 mm.

Red	Each	**£1·25**	c
Black	Each	**£1·25**	c

EB-342

EB-355

TERMINAL, crocodile clip, plated steel. In pack of 12.
10 packs **£5·20** Pack **£0·58** c

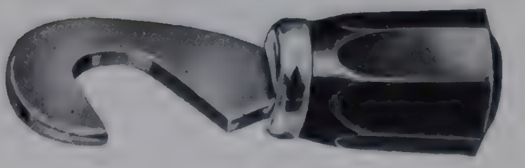
EB-355

EB-357

SLEEVES, rubber, for insulating clips EB-355. In pack of 5 red and 5 black.
10 packs **£5·20** Pack **£0·58** c

EB-360

SPADE ENDS, with insulated sleeve coloured red or black. In pack of 5 red and 5 black.
10 packs **£4·60** Pack **£0·51** c



EB-360

All items on this page normally available from stock.

GENERAL PURPOSE ACCESSORIES
(continued)

EB-500

WIRE, tinned copper, uninsulated. On reel of approx. ½ lb (225 g).

Gauge Diameter	22 0·28	18 SWG 1·2 mm	
Reel	£1·00	1·00	c

EB-502

SLEEVING, PVC, insulation for EB-500, bore 2 mm. On reel of approx. 20 metres.

Colour	Black	Red	Yellow	
Reel	£0·50	0·50	0·50	c

EB-510

WIRE, 3A rating, single core 16 strand/0·2 mm, PVC insulated. On reel of approx. 25 metres.

Colour	Black	Red	Yellow	
Reel	£0·75	0·75	0·75	c

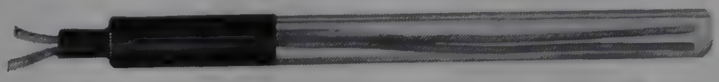
EB-512

WIRE, 13A rating, single core 30 strand/0·25 mm, PVC insulated. On reel of approx. 25 metres.

Colour	Brown	Blue	Green	
Reel	£1·40	1·40	1·40	c

TT-560

WIRE CUTTER STRIPPER. For details and price see entry in List No. sequence.



Example of use of shrink sleeving EB-520

EB-520

HEAT SHRINKABLE SLEEVING, for insulation and identification of wires and for forming protective sleeves over glass to wire junctions such as on resistance thermometers, electrodes, etc. The irradiated polyolefine sleeve quickly shrinks, when heated to about 100°C, by up to 50% of its supplied diameter to take up the shape of the object it encloses. Maximum working temperature 105°C.

Int. dia. Int. dia. shrunk Wall	3 1·5 0·5	6·5 3·2 0·6	9·5 5·0 0·8	13 mm 6·5 mm 0·8 mm	
10 metres	£0·80	1·30	1·85	2·40	c
Metre	£0·15	0·20	0·25	0·30	

POWER CONTROLLERS

INCORPORATING ENERGY REGULATORS

For controlling power input by periodically and automatically switching on and off the electrical supply. The ratio of 'on' time to total cycle time determines the average input and is infinitely variable. Because of their small size, continuously variable adjustment and freedom from power loss, these energy regulators can, to advantage, replace three-heat switches and resistance controls on most forms of heating equipment.

OPERATION

The regulator is essentially a single-pole switch having one contact mounted on a bimetal strip wound with a heater. When the switch is closed, current flows through the heater. The bimetal increases in temperature and opens the switch, thus breaking the supply to the heater. When the bimetal cools the cycle is repeated. The ratio of the 'on' to the total time and thus the average input is controlled by a cam operated by the control knob.

CHARACTERISTICS

Continuous and maximum current ratings are given for each regulator. The continuous rating applies when the apparatus is normally required to run for long periods. The maximum rating should be used only when the apparatus is to be used for periods of one or two hours per day. For d.c. supplies the regulator contacts will only switch 0·1A and so they must always be used with a relay such as ED-101.

Energy regulators provide automatic compensation for changes in the supply line voltage.

The controllers listed are all fitted with non-linear regulators which are suitable for controlling heating apparatus e.g. furnaces, which, in order to have a high heating rate, have higher power heaters than are required to maintain the maximum temperature. 50% power setting is at a scale reading of about 90.

SUMMARY OF CHARACTERISTICS

List No.	Mains connection	Output connection	Voltage V	Current rating on a.c. supplies	
				Continuous A	Maximum A
EC-750	5A 3-pin plug	Cable	200/250	5	5
EC-755	5A 3-pin plug	5A 3-pin socket	200/250	5	5
EC-760	13A 3-pin plug	13A 3-pin socket	200/250	4·3	11
EC-810	Cable	Cable	200/250	4·3	11
EC-820	,,	,,	200/250	4·3	11
EC-845	13A 3-pin plug	,,	200/250	4·3	11
EC-900	For panel mounting		200/250	4·3	11
EC-910	,, ,, ,,		220/230 240/250	4·3	11

Detailed listing—see following pages.

All items on this page normally available from stock.

Gallenkamp ELECTRICAL CONTROLS

POWER CONTROLLERS

These controllers are mounted in stove enamelled steel cases fitted with indexing control knob with arbitrary scale divided 0–100. They all employ the same energy regulator but EC-750 and EC-755 are limited by the rating of the socket outlets.

The controllers are suitable for use on 200/250V a.c. single phase supplies only.

Technical information—see page 206.

EC-750

POWER CONTROLLER, *Gallenkamp*, as specification, designed to plug into a 5A 3-pin socket outlet to BS 546 and to accept a 3-core cable for connection to apparatus to be controlled. Rating 5A continuous and maximum.
Each **£6·75** *b*

EC-755

POWER CONTROLLER, *Gallenkamp*, as specification, designed to plug into a 5A 3-pin socket outlet to BS 546 and to accept a 5A 3-pin plug connection from the apparatus to be controlled. Rating 5A continuous and maximum.
Each **£6·70** *b*

EC-760

POWER CONTROLLER, *Gallenkamp*, as specification, designed to plug into a 13A 3-pin socket outlet to BS 1363 and to accept a 13A 3-pin plug connection from the apparatus to be controlled. A 13A fuse is fitted. Rating 6A continuous, 13A maximum intermittent.
Each **£6·75** *b*

EB-124 **Fuse, 13A cartridge for above. For price see entry in List No. sequence.**

EC-750

EC-760

ELECTRONIC RELAY

A mains powered transistorised relay which in effect converts a low current switch into a power switch. A typical and important application is its use with a thermoregulator or contact thermometer to control heater switching; a contact thermometer by itself can switch only a few milliamperes, but using the transistorised relay as a coupling, currents of up to 20A can be switched in each of two non-inductive mains voltage circuits.

The low voltage control circuit is intrinsically safe and a 2-pin plug connector is supplied for attachment to the leads of the contact thermometer.

TECHNICAL DATA

Dimensions	H W D 19 × 11·5 × 7·5 cm
Power contacts	Double pole changeover rated at 20A, 250V a.c. non-inductive, or 1A, 220V d.c.
Control circuit	8V d.c. open circuit 12 mA closed circuit The control circuit is normally earthed but may be used independently in which condition the voltage between the control circuit and earth must not exceed 250V

EC-780

ELECTRONIC RELAY, *Gallenkamp*, as specification. Completely enclosed in a die-cast light alloy box suitable for wall or bench mounting and fitted with mains and load indicator lamps and connecting block for load and mains supply. Includes instructions with illustrated examples of typical circuit applications. **Without mains or load circuit cables.**

For 200/250V a.c. single phase supplies. Each **£17·00** *b*

MAINS
LOAD
Gallenkamp

EC-780

All items on this page normally available from stock.

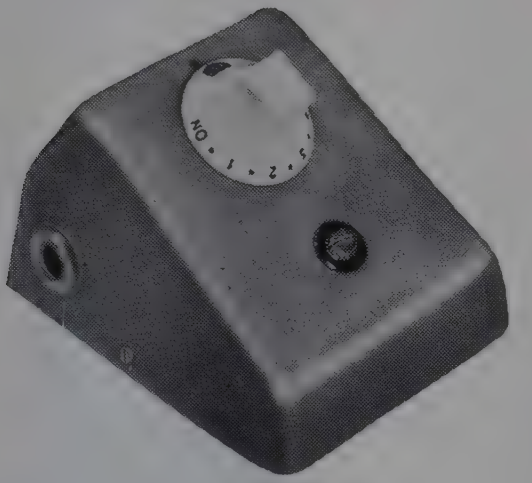
POWER CONTROLLERS

INCORPORATING NON-LINEAR ENERGY REGULATORS

EC-810

EC-810

CONTROLLER, for in-line connection. An energy regulator fitted inside a metal case and suitable for controlling small furnaces, hotplates, water baths, etc. It has an arbitrary scale 0–100. Current rating 4·3A continuous duty, 11A maximum on 200/250V a.c. single phase. **Supplied without leads** ... Each **£2·90** *m*



EC-820

EC-820

CONTROLLER, for in-line connection. Comprises an energy regulator fitted inside a plastics case with a sloping front panel on which a neon indicator light is mounted. Suitable for controlling 4·3A on continuous duty, 11A maximum, on 200/250V a.c. single phase supply. Each **£4·57** *m*

EC-845

EC-845

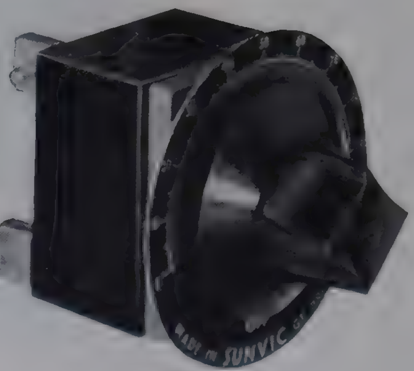
CONTROLLER, with 3-pin input plug. An energy regulator enclosed in a plastics case which forms an integral part of a 3-pin 13A plug to BS 1363. Fitted with an easily replaceable 13A cartridge fuse. Suitable for controlling small furnaces, hotplates, water baths, etc. It has an arbitrary scale 0–5. Current rating 4·3A on continuous duty, 11A maximum, on 200/250V a.c. single phase supplies only. With terminals for cable outlet connection ... ... Each **£2·80** *m*

EB-124 **Fuse,** 13A cartridge for above. For price see entry in List No. sequence.

ENERGY REGULATORS

FOR PANEL MOUNTING

These regulators are intended for single hole fixing on panels between 1·6 mm and 8·0 mm thick. They are supplied with a plain indexed knob, arbitrary scale of 0–100 divisions, and screw terminal connections. Dimensions behind panel, approx. 5×5×5 cm including terminals.



EC-900
EC-910

EC-900

ENERGY REGULATOR. A regulator with a **non-linear** scale reading/power output characteristic. The power output increases very rapidly at the upper end of the scale so that this regulator is most convenient for use with hotplates, furnaces, etc., which have a high heat capacity and therefore require considerably more power for heating than for maintaining temperature. Current rating 4·3A for continuous duty, 11A maximum, on 200/250V a.c. single phase supplies. For higher currents and d.c. supplies a relay such as ED-101 must be used with the regulator ... ... Each **£1·37** *m*

EC-910

ENERGY REGULATOR. A regulator with a **linear** scale reading/power output characteristic. Best suited for controlling apparatus such as low temperature water baths and ovens in which the power requirement varies in an approximately linear manner with temperature. Current rating 4·3A for continuous duty, and 11A maximum, on 220/230V or 240/250V a.c. single phase supplies. For higher currents or d.c. supplies a relay such as ED-101 must be used with the regulator ... Each **£3·05** *m*
Also available for other voltages to order.

When ordering please state voltage and frequency of supply.

All items on this page normally available from stock.

HOTWIRE VACUUM RELAYS

The relays listed are operated by the thermal expansion of a wire through which the control current passes. The period of 2 or 3 seconds which the wire takes to heat or cool causes a delay in the operation of the contacts thus preventing 'chattering'. Surge suppressors are fitted as standard.

Hotwire relay switches are suitable for thermostats such as the bimetallic type with 'normally closed' contacts and for liquid expansion thermoregulators and contact thermometers with 'normally open' contacts. The HVR is for use with either, whereas the HVS 103/3M is for use only with 'normally closed' and the HVS 103/4M only with 'normally open' contacts. Most contact thermometers, however, are better used with electronic relays such as EC-780.

ED-101

RELAY, HOT WIRE VACUUM, Type HVR, **normally closed or open,** as specification, suitable for controlling loads up to 1·2 kVA on 100/130V and 2·0 kVA on 200/250V supplies.

For 200/250V a.c. single phase supplies... Each **£6·90** *m*
For 100/130V a.c. single phase supplies... Each **£7·15** *mN*

When ordering please state voltage and frequency of supply.

ED-104

RELAY, HOT WIRE VACUUM, Type HVS 103/3M, **normally closed,** as specification, suitable for controlling loads up to 2·0 kVA on 100/110V and 3·5 kVA on 200/250V supplies.

For 240/250V a.c. single phase supplies... Each **£9·80** *mN*
For 100/110, 200/210 or 220/230V a.c. single phase supplies. Each **£9·80** *mN*

ED-106

RELAY, HOT WIRE VACUUM, Type HVS 103/4M, **normally open,** as specification, suitable for controlling loads up to 2·0 kVA on 100/110V and 3·5 kVA on 200/250V supplies.

For 240/250V a.c. single phase supplies... Each **£10·35** *mN*
For 100/110, 200/210 or 220/230V a.c. single phase supplies. Each **£10·35** *mN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

ED-110 **Relay tube,** type 602, for ED-101 ... Each **£3·23** *m*
ED-112 **Relay tube,** type 603, for ED-104 or ED-106. Each **£4·20** *m*

SLIDING RESISTORS

A range of ruggedly constructed tubular resistors, using diecast end plates and solid drawn steel tubes with steel tie rods. Light weight construction and good ventilation give rapid temperature stabilisation.

The insulated terminals accept either 4 mm plugs, spade type connectors, or wires.

NOTE:

Wherever voltages in excess of 100V are applied, **enclosed types** should be used for safety.

SLIDING RESISTORS, open type, for use with safe low voltage.

List No.	Max. amps	Resistance ohms	Tube size cm	Each	
				£	
ED-300	10	2·8	25×3	**5·50**	*m*
		5·7	30×5	**7·70**	*m*
		11	45×6	**12·90**	*m*
ED-302	5	11·6	25×3	**4·95**	*m*
		23	30×5	**6·30**	*m*
		45	45×6	**10·20**	*m*
ED-304	2	56	25×3	**4·95**	*m*
		113	30×5	**6·30**	*m*
		215	45×6	**10·20**	*m*
ED-306	1	265	25×3	**4·95**	*m*
		535	30×5	**6·30**	*m*
		1040	45×6	**10·20**	*m*

ED-300 to ED-306

SLIDING RESISTORS, enclosed type, for use with mains voltage.

List No.	Max. amps	Resistance ohms	Tube size cm	Each	
				£	
ED-320	2	56	25×3	**7·15**	*m*
		113	30×5	**8·80**	*m*
		215	45×6	**12·90**	*m*
ED-322	1	265	25×3	**7·15**	*m*
		535	30×5	**8·80**	*m*
		1040	45×6	**12·90**	*m*
ED-324	0·45	765	25×3	**7·15**	*m*
		1500	30×5	**8·80**	*m*
		2950	45×6	**12·90**	*m*

ED-320 to ED-324

Items on this page normally available from stock except those coded *N*.

VARIABLE TRANSFORMERS

Variac toroidially wound variable autotransformers provide smooth stepless voltage regulation over the whole output range with clear indication of setting on a calibrated 320° scale.

VOLTAGE CONNECTIONS

Line-Voltage. The input is applied across the whole winding and the output is variable from zero up to input line voltage.

Over-Voltage. The input is applied across less than the whole winding by means of the tapping provided, giving a step-up in voltage.

ED-602

ED-660

CURRENT RATINGS

Based on a temperature rise not exceeding 55°C for continuous duty, in an ambient not exceeding 45°C.

Rated Current can be drawn at any voltage setting. When the over-voltage connection is used, the load should not draw more than rated current.

Maximum Current can only be drawn at or near full output voltage, or near zero output, when the line-voltage connection (see above) is used. A constant-impedance load (i.e. one drawing current proportional to applied voltage) which draws maximum current at line voltage can be controlled from zero to line voltage.

For loads which are not of constant impedance, the current drawn at line voltage should normally be limited to the rated current.

TRANSFORMERS, *Variac*, bench mounting, in ventilated case fitted with shrouded terminals.

Input 240V 50/60 Hz single phase.
Output 0—240V for line-voltage connection.
0—270V for over-voltage connection.

All models are centre-tapped and can be used as 120V input to give 0—240V output. In this case the current drawn must not exceed half the rated current.

List No.	Type No.	Rated current (amps)	Maximum current (amps)	Each	
				£	
ED-600	V3H-M	1	1·13	**8·00**	fS
ED-601	V5H-M	2	2·5	**9·15**	fS
ED-602	V6H-M	3	3·75	**11·00**	fS
ED-604	100R-M	8	9·0	**18·80**	fS
ED-606	V30H-M	15	17·5	**31·67**	f
ED-608	50B-M	20	31·0	**56·70**	f

TRANSFORMERS, *Variac*, **portable,** comprising transformer mounted in metal case with carrying handle, complete with mains switch, cartridge fuse and 6 ft length of 3-core cable. The output is fitted with a 13A 3-pin socket to BS 1363. The *Variac* scale indicates the output voltage but more accurate readings may be obtained on models fitted with a voltmeter. Supplied in over-voltage connection.

Input 240V 50 Hz single phase. Output 0–270V, 3A.

List No.	Type No.	Description	Each	
			£	
ED-660	V6 HPS	Socket outlet	**16·77**	f
ED-662	V6 HPSV	ED-660 with voltmeter	**21·77**	f

Items on this page coded S normally available from stock.

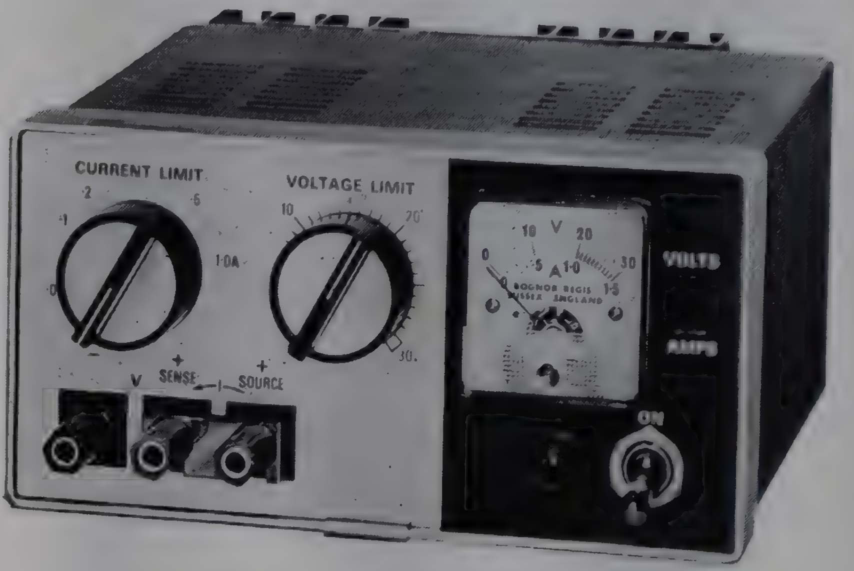
LOW VOLTAGE SUPPLY UNITS

ED-910

LOW VOLTAGE SUPPLY UNIT, miniature, solid state stabilised, 1·25A max., 30V max. For use as a bench power supply for transistorised equipment or in place of batteries. Current and voltage continuously adjustable by calibrated limit setting controls. Output is d.c. with ripple less than 200 μV peak-to-peak. Regulation: 1 mV +0·03% for supply voltage change of ±20V a.c. Temperature coefficient; −(3 mV+0·02%) per degC. Internal impedance; less than 10 milliohms at 1 kHz. With continuous current short circuit protection device.

External binding posts permit the use of the unit as a current regulator, pulsed voltage regulator, temperature regulator or power amplifier. Dimensions 19×8×16 cm, net weight 2·5 kg. With detailed instructions manual. For 210/250V 50/60 Hz supplies ... Each **£42·50** *mS*

Model for 105/125V 50/60 Hz supplies available to special order.



ED-910

ED-930

LOW VOLTAGE SUPPLY UNIT, 12A max., voltage continuously adjustable from 0 to 25V a.c. or unsmoothed d.c. For wall mounting, intended for use in laboratories requiring multiple outlets to replace accumulators or wet cells.

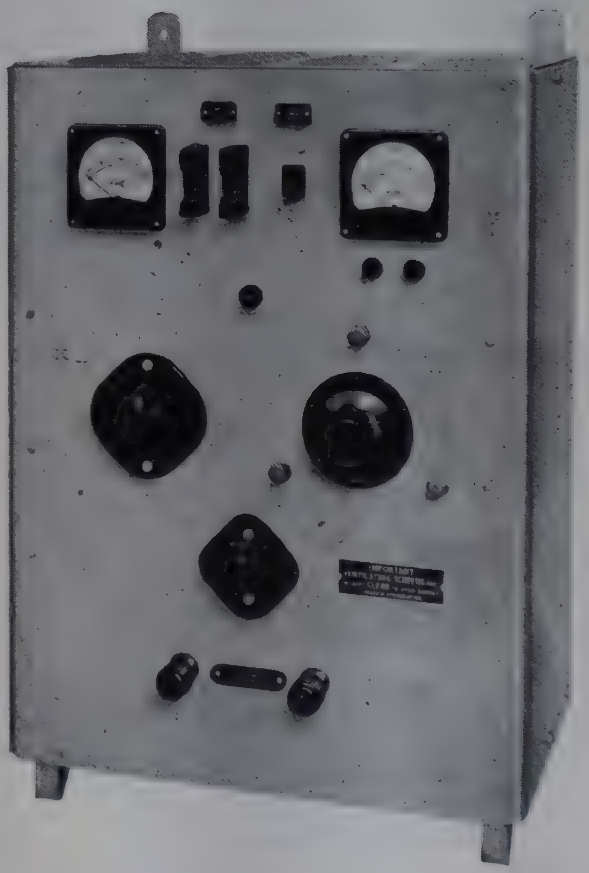
Includes moving iron ammeter and voltmeter, mains fuses and magnetic circuit breaker in the output circuit. The main transformer is double wound and vacuum impregnated and output control is provided by a toroidally wound adjustable autotransformer. D.C. output is derived from a full wave selenium rectifier bridge. With terminals for permanent and temporary output connections. Dimensions 43×28×41 cm high. Net weight 27 kg. For 200/250V 50 Hz single phase supplies. Each **£71·00** *m*

ED-932

LOW VOLTAGE SUPPLY UNIT, as ED-930 but **24A max.** Dimensions 51×37×78 cm high. Net weight 55 kg ... ... Each **£110·00** *m*

ED-934

LOW VOLTAGE SUPPLY UNIT, as ED-930 but **48A max.** Dimensions 51×38×78 cm high. Net weight 73 kg ... ... Each **£165·00** *m*



ED-932

Gallenkamp
REGD. TRADE MARK

LOW VOLTAGE SUPPLY UNIT

With three circuits each having an output of 7A at 12V see EJ-095 in List No. sequence.

BATTERIES

Single 2V cells in glass containers
see BJ-160 to BJ-166 in List No. sequence.

Voltage reference cell 1·35V
see EF-490 in List No. sequence.

Items on this page coded S normally available from stock.

MOVING COIL METERS

A range of high quality moving coil meters made to the requirements of BS 89 Industrial Limits. Accuracy ±1% on d.c., ±2% on a.c. instruments. With 95 mm scales and lance type pointer for accurate readings.
Overall dimensions are 120×97 mm and a circular cut-out of 67·5 mm dia. is required for panel mounting.

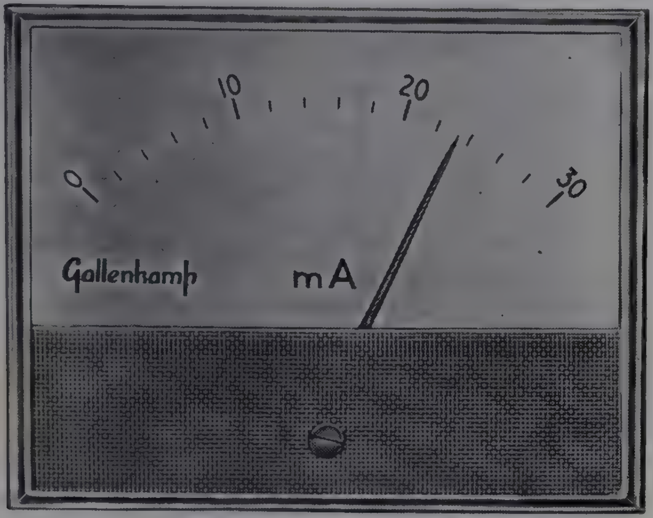
D.C. INSTRUMENTS

EE-514
MICROAMMETERS, D.C., moving coil, as specification.

Range 0 to	10	25	50	100 µA	
Resistance, approx.	9000	3000	1300	1000 ohms	
Each	£23·00	11·50	10·00	9·75	c

EE-534
MILLIAMMETERS, D.C., moving coil, as specification.

Range 0 to	1	3	10	30	100 mA	
Each	£8·50	8·50	8·50	9·00	9·00	c



EE-534

EE-554
AMMETERS, D.C., moving coil, as specification.

Range 0 to	1	3	10	30A	
Each	£9·00	9·00	9·00	9·00	c

EE-574
MILLIVOLTMETERS, D.C., moving coil, as specification.

Range 0 to	10	100 mV	
Each	£13·75	9·25	c

EE-594
VOLTMETERS, D.C., moving coil, as specification. Sensitivity 1000 ohms/V.

Range 0 to	1	3	10	30	100V	
Each	£8·75	8·75	8·75	8·75	8·75	c

A.C. INSTRUMENTS

EE-604
AMMETERS, A.C., moving coil, as specification, with rectifier and external current transformers suitable for use on mains frequencies.

Range 0 to	5	10	30A	
Each	£16·50	16·50	20·50	c

EE-624
VOLTMETERS, A.C., moving coil, as specification, with rectifier. Sensitivity 1000 ohms/V.

Range 0 to	30	300V	
Each	£11·00	11·00	c

EE-645
BENCH STAND for EE-514 to EE-624. With sloping front, top terminals and interior leads... Each £2·30 c

MOVING IRON METERS

MILLI-AMPERES

EE-720
EE-722
EE-724

A range of economically priced bench type a.c./d.c. instruments for educational and general laboratory use. These moving iron, spring controlled meters have a 60 mm dial and are mounted in a robust aluminium case 85×90×80 mm with two captive head insulated terminals.

EE-720
MILLIAMMETERS a.c./d.c. moving iron, as specification.

Range 0 to	25	100 mA	
Each	£6·00	6·00	m

EE-722
AMMETERS, a.c./d.c. moving iron, as specification.

Range 0 to	2	5	10A	
Each	£6·00	6·00	6·00	m

EE-724
VOLTMETERS, a.c./d.c. moving iron, as specification.

Range 0 to	15	250V	
Each	£6·00	7·50	m

All items on this page normally available from stock.

MULTIRANGE METERS

Self-contained, portable, multirange a.c./d.c. measuring instruments with meter accuracy within BS 89 Industrial limits.

EE-800,
(EE-820, EE-840 and EE-860 are similar)

COMPARISON OF MODELS

	Model 7††	Model 40††	Model 8	Model 9
Movement	1 mA	6 mA	50 μA	50 μA
Sensitivity	500 Ω/V	166 Ω/V	20 kΩ/V†	20 kΩ/V†
No. of ranges	47	41	30	26
d.c. voltages	5 mV to 10 kV	60 mV to 1200V	2·5 to 2500V	3 to 3000V
a.c. voltages	5V to 1 kV	6V to 1200V	2·5 to 2500V	3 to 3000V
d.c. currents	1 mA to 10A	3 mA to 12A	50 μA to 10A	50 μA to 10A
a.c. currents	5 mA to 10A	6 mA to 12A	100 mA to 10A	10 mA to 10A
Resistances (battery)	10 kΩ to 1 MΩ	1 kΩ to 100 kΩ	2 kΩ to 20 MΩ	2 kΩ to 20 MΩ
Resistances (mains)	10 MΩ to 40 MΩ	1 MΩ	200 MΩ	200 MΩ
Capacitance	20 μF	—	—	—
Decibels	−25 to +16	—	—	—

† On all d.c. ranges: 1 kΩ/V on a.c. above 10V on Model 8; 2 kΩ/V on a.c. above 10V on Model 9.
†† incorporate facility for halving all current and voltage ranges.

EE-800
MULTIRANGE METER, *Avo* **Model 7 Mark 2,** specification as table. Supplied with leads, clips and instructions ... ... Each **£34·41** *m*

EE-805
MULTIRANGE METER, *Avo* **Model 7X,** as EE-800 but tropicalised ... ... Each **£42·65** *m*

EE-820
MULTIRANGE METER, *Avo* **Model 40 Mark 2,** specification as table. Supplied with leads, clips and instructions ... ... Each **£34·41** *m*

EE-840
MULTIRANGE METER, *Avo* **Model 8 Mark 3,** specification as table. Supplied with leads, clips and instructions ... ... Each **£37·20** *m*

EE-845
MULTIRANGE METER, *Avo* **Model 8X,** as EE-840 but tropicalised ... ... Each **£45·00** *m*

ACCESSORY

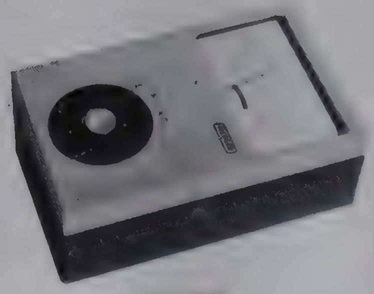
EE-850	**Carrying case for EE-800 to EE-845 ...**	**Each**	**£6·66**	*m*

EE-870

EE-860
MULTIRANGE METER, *Avo* **Model 9 Mark 4,** specification as table. All range switches, controls and terminals are identified with graphical symbols which in general follow the requirements of the International Electrochemical Commission. Supplied with leads, clips and instructions ... ... Each **£37·20** *m*

EE-870
MULTIRANGE METER, *Avo* **Multiminor Mark 4.** A pocket meter with 7 cm scale. Sensitivity 10 kΩ/V on d.c. and 1 kΩ/V on a.c. ranges. Twelve voltage ranges cover 100 mV to 1 kV d.c. and 10V to 1 kV a.c. Five current ranges are 100 μA to 1A d.c. and two resistance ranges are 20 kΩ and 2 MΩ. Dimensions 14×9×3·5 cm, weight 0·45 kg. Supplied with leads and clips in plastics case ... ... Each **£12·63** *m*

INSULATION TESTER



EE-995

EE-995
INSULATION AND CONTINUITY TESTER, *Megger.* Switched ranges 0 to 200 MΩ at 500V d.c. for insulation testing and 0 to 5000 kΩ at 7·5V d.c. and 0 to 200 Ω at 4·5V d.c. for continuity testing. With battery check. Dimensions 15×6×9·5 cm. Complete with six 1·5V batteries and test leads in case. Each **£21·50** *fN*

Items on this page normally available from stock except those coded *N.*

REFLECTING GALVANOMETERS

EVRO GALVANOMETERS, *PYE UNICAM*

Taut suspension galvanometers to meet the needs for low-priced, sensitive meters for educational, research and routine industrial applications.

Reading indication is presented as a hairline in an exceptionally bright spot on a cm scale. The range switch enables the instrument sensitivity to by adjusted in convenient steps whilst retaining critical damping conditions and presenting constant resistance at the input terminals. Oil damping is provided as well as diode and fuse protection circuit for the movement. The range switch has a 'Short' position for transit.

Dimensions 14×19×30 cm.

For 200/240V or 110V 50/60 Hz single phase supplies.

When ordering please state voltage and frequency of supply.

EF-190
EF-193

List No.	EF-190	EF-193
Coil resistance—direct (ohms)	14	950
Coil resistance—shunted (ohms)	9·3	905
Period—nominal (seconds)	2	2
Critical damping resistance (ohms)	30	19,000
Typical sensitivity (mm/μA)	8	190
Each	**£24·00**	**£24·00**

f

SCALAMP GALVANOMETERS, *PYE UNICAM*

A taut suspension movement is mounted in a moulded plastics case together with a shunt, a lamp and a transformer for mains operation. A 15 cm scale with side and central zero is fitted to the front of the case.

Each galvanometer has a slow motion set-zero control knob. The shunt is of the constant damping, constant current Ayrton-Mather type with 6 positions giving a 1 to 1000 range of sensitivities. A shorting switch incorporated in one foot ensures the coil is short circuited and thus damped when the instrument is lifted. Diode and fuse protection of movement are provided.

Dimensions 20×28×18 cm.

For 200/250V or 110V 50/60 Hz single phase supplies.

When ordering please state voltage and frequency of supply.

EF-200
EF-203

List No.	EF-200	EF-203
Coil resistance (ohms)	24	1400
Period (seconds)	2	2
Critical damping resistance (ohms)	230	25,000
Sensitivity × 1 range (mm/μA)	17	190
(μA/mm)	0·056	0·0053
Each	**£34·00**	**£34·00**

fS

EF-215

GALVANOMETER PREAMPLIFIER, *Pye Unicam*, to increase the sensitivity of normal-range galvanometers. The preamplifier has an amplification factor of 125 and noise level of 10^{-10}A referred to input. Input resistance 100 ohms. Overload protection automatically reduces output current to zero when input exceeds 20 μA. Dimensions 29×15×13 cm. For 200/250V 50 Hz single phase supplies ... ... Each **£42·00** *f*

Items on this page coded S normally available from stock.

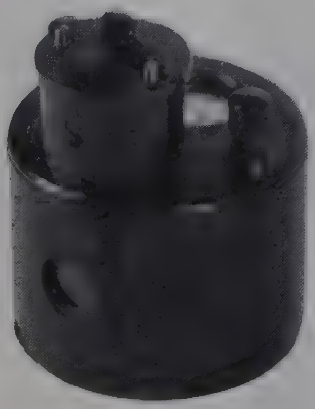
REFLECTING GALVANOMETERS *(Contd.)*

EF-250

GALVANOMETERS, REFLECTING AND POINTER, pot pattern. A very robust instrument carrying a plane mirror and a 1 metre focus lens. Scale 5–0–5 corresponding approximately to 3–0–3 μA.

Coil resistance, approx.	1000 ohms
Period (damped)	2 sec
Sensitivity at 1 metre	
170 mm/μA and 0·17 mm/μV	

Each **£15·00** *f*



EF-250

EF-260

EF-260

GALVANOMETER LAMP AND SCALE. Suitable for all types of reflecting galvanometers, with a matt transparent scale numbered 25–0–25 and 0–50 cm mounted on heavy base with vertical and horizontal adjustment. Optical projector is universally adjustable and fitted with hairline and pointer. A transformer with tappings for 200/250V a.c. mains housed in the base operates a 4V 8W gas filled bulb ... ... Each **£21·00** *f*

RESISTANCE BRIDGES

EF-390

WHEATSTONE BRIDGE, Post-Office Pattern, with series arm containing 16 coils having values from 1 ohm to 5000 ohms in the series 1, 2, 2, 5, giving a total resistance of 11,110 ohms. Accuracy of adjustment of each coil to ±0·2%. The ratio arms of 10, 100 and 1000 ohms have an accuracy of ±0·1%. The bakelite top panel is engraved with the value of each resistance and contains the sockets, interchangeable spring loaded plugs, tapping keys and 4 mm terminals. Complete in hardwood case with hinged lid ... ... Each **£29·97** *m*

EF-390

EF-410

WHEATSTONE BRIDGE, *Pye Unicam,* **4-decade pattern,** with total range of 0·001 ohm to 10 megohms. This portable bridge consists of two ratio arms with steps of 1, 10, 100 and 1000, and a variable arm of four decades in steps of thousands, hundreds, tens and units of ohms. Complete with low resistance switches clearly showing the figures against a contrasting background and a built-in pointer galvanometer which may be by-passed when using an external reflecting galvanometer for greater accuracy. Dimensions 46×19×18 cm ... ... Each **£94·00** *f*

EF-415

WHEATSTONE BRIDGE, *Pye Unicam,* **4-decade pattern,** as EF-410 but with total range of 0·0001 ohm to 1 megohm. The decade variable arm has steps of hundreds, tens, units and tenths of ohms.

Each **£94·00** *f*

EF-410

DECADE RESISTANCE BOXES

GENERAL PURPOSE

Suitable for many educational and industrial laboratory purposes. Accuracy ±1%.

Maximum current: Units decade 700 mA. Tens decade 140 mA. Hundreds decade 43 mA. Thousands decade 14 mA. Tenthousands decade 4·3 mA.

EF-430

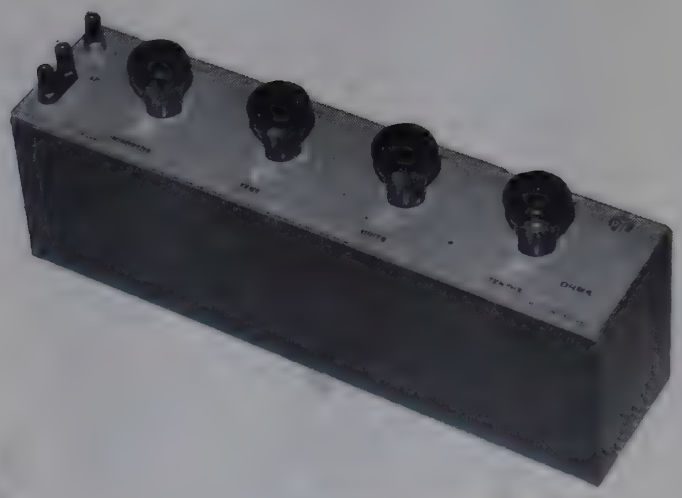
RESISTANCE BOX, low decade pattern, as above specification, with 3 decades for units, tens and hundreds with total resistance of 999 ohms in steps of 1 ohm. Each **£10·00** *f*

EF-432

RESISTANCE BOX, medium decade pattern, as above specification, with 3 decades for hundreds, thousands and tenthousands with total resistance of 99,900 ohms in steps of 100 ohms ... Each **£10·00** *f*

RESISTANCE
X 10k Ω
X 1k Ω
TOLERANCE

EF-432



EF-450

PRECISION

Suitable for industrial and educational work with d.c. and audio frequencies. Each box has four decades from the range shown below. The accuracy of the decades is ±0·02% except the 'tenths' decades which are ±0·2%.

Maximum current: Tenths decade 2000 mA. Units decade 700 mA. Tens decade 200 mA. Hundreds decade 70 mA. Thousands decade 20 mA.

EF-450

RESISTANCE BOX, *Pye Unicam,* **4-decade pattern,** as specification, with total resistance of 1111 ohms in steps of 0·1 ohm. Includes decades for hundreds, tens, units and tenths of ohms... ... ... Each **£50·00** *fN*

EF-455

RESISTANCE BOX, *Pye Unicam,* **4-decade pattern,** as specification, with total resistance of 11,110 ohms in steps of 1 ohm. Includes decades for thousands, hundreds, tens and units of ohms ... ... Each **£54·00** *fN*

EF-465

RESISTANCE BOX, *Pye Unicam,* **5-decade pattern,** as specification, with total resistance of 11,111 ohms in steps of 1 ohm. Includes decades for thousands, hundreds, tens, units and tenths of ohms ... Each **£65·00** *fN*

WESTON CADMIUM CELL

EF-475

STANDARD WESTON CELL. A saturated type H cell producing e.m.f. of 1·0186V at 20°C with temperature coefficient −40 μV per degC rise between 15° and 25°C. In case 4·5×4·5×10 cm high ... ... Each **£6·90** *m*

MERCURY CELL

These cells provide an extremely stable d.c. reference voltage for calibration purposes and offer advantages over the Cadmium cell in that they are far more robust and can provide a small d.c. current without damage. The e.m.f. of 1·35V remains constant within 1% from −20° to +70°C and for short period comparisons is stable within one part in a million. Supplied in sealed metal case with insulated terminals.

EF-490

VOLTAGE REFERENCE BATTERY, *Mallory,* **single cell, 1·35V.** Size 63×40×95 mm, in carrying case. Each **£10·00** *f*

Items on this page normally available from stock except those coded *N.*

POTENTIOMETERS

EF-600

POTENTIOMETER, *Pye Unicam,* **Model S,** a general purpose potentiometer, particularly suitable for students' use, reading directly in volts and millivolts with a range from 0 to 1·8V in steps of 1 mV. The circular slide wire, divided into 200 parts, has a range of 200 mV. The instrument is fitted with manganin coils and incorporates fine and coarse rheostats for accurate current adjustment. Standardisation can be carried out without disturbing the dial settings. Accuracy is ±0·1% or ±½ scale division whichever is greater. Mounted in metal case on the base of which the circuit diagram is printed. Dimensions 23×17×8 cm, weight 1·7 kg ... ... Each **£37·00** *f*

For suitable galvanometer for use with EF-600, see EF-200 et seq.

EF-600

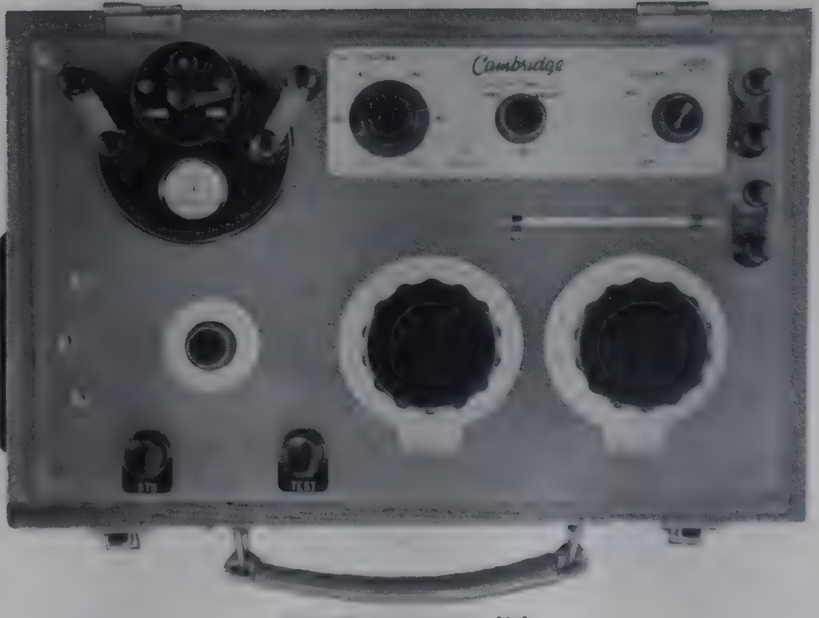
EF-610

POTENTIOMETER, *Pye Unicam,* portable, with range 0 to 1·8V in steps of 1 mV. An entirely self-contained, precision potentiometer incorporating a circular slide wire, a standard cell and a robust taut suspension pointer galvanometer. Provision is made for using an external galvanometer. With multipliers of 0·1 and 0·01 converting each scale division into 100 μV and 10 μV respectively. Standardisation can be carried out without disturbing the dial settings. Accuracy better than ±0·1% or 1 division whichever is greater. Dimensions 29×22×16 cm, weight 5 kg ... ... Each **£82·00** *f*

EF-610

EF-628

POTENTIOMETER, multi-purpose, range 0·01 to 101 mV d.c. A main potential dial with 100 click-stop steps of 1 mV each is supplemented with a fine potential slide wire dial from −0·05 mV to +1·05 mV divided in 0·01 mV. Accuracy is ±0·1% or ±½ scale division, whichever is the greater. This completely self-contained instrument is particularly useful for checking the calibration of thermocouples and associated indicating and control instruments. It has a built-in galvanometer and standard cell and the case provides a compartment for batteries (1·3 to 1·5V required, *Mallory* RM42R recommended). Dimensions 36×26×18 cm, weight 6 kg.
Without batteries ... ... Each **£99·50** *f*



EF-628 without lid

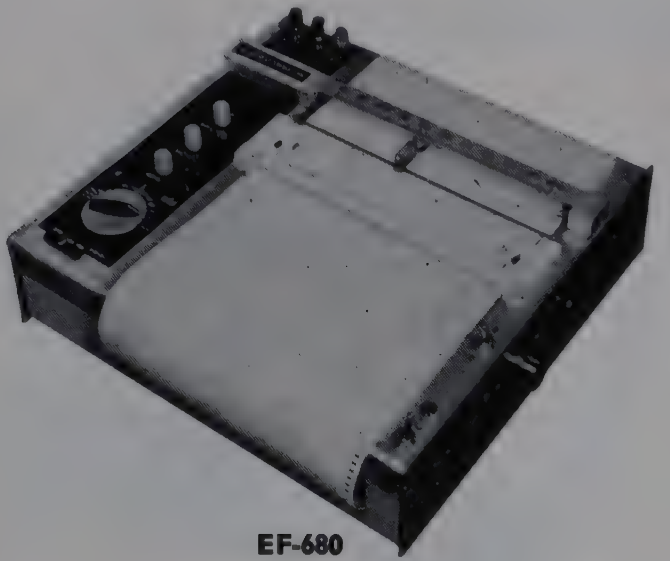
Gallenkamp
REGD TRADE MARK

TITRATION POTENTIOMETER

Suitable for potentiometric, differential and dead stop titrations. See EJ-890 in List No. sequence.

All items on this page normally available from stock.

RECORDING POTENTIOMETER



EF-680

EF-680

RECORDING POTENTIOMETER, *Smith Servoscribe*, for continuous **single point** recording on perforated 20 cm (8 in) strip chart and standard graph paper size A4. Suitable for e.m.f. and thermocouple measurements. Maximum sensitivity 2 mV f.s.d. Pen speed approx. 1 sec f.s.d. Chart speeds 3 to 3600 cm/hr. Incorporates range selection, range expansion and zero shift controls. Chart drive reversible. For 110/120 and 200/240V 50 Hz single phase supplies. Dimensions 36×35×10 cm, weight 8 kg.
Each **£285·00** *f*

REPLACEMENT PARTS

EF-682 Chart paper ... 10 rolls £8·40 Roll £0·94 *f*

CL-940

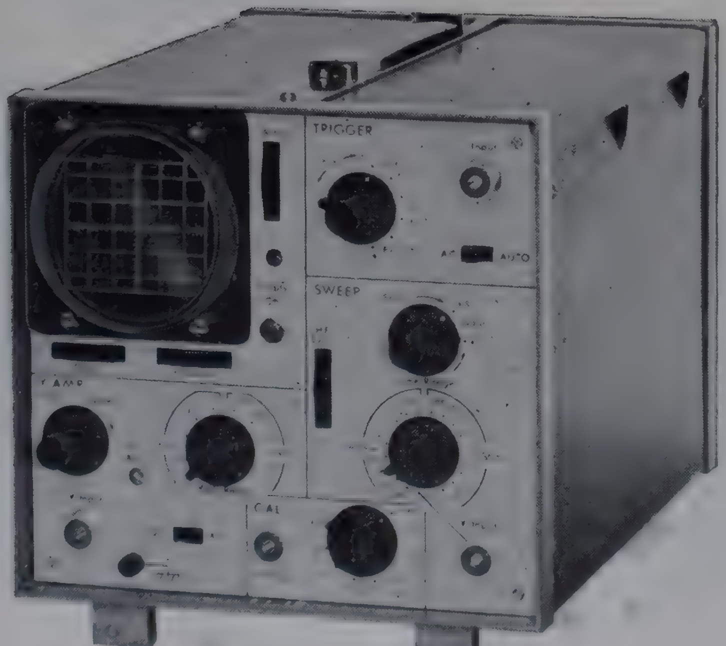
STRIP CHART RECORDER, single point continuous record, 1·3 sec f.s.d. Chart speeds 15, 30 and 60 in/hr. For full details and price see entry in List No. sequence.

EF-925

OSCILLOSCOPES

EF-925

OSCILLOSCOPE, suitable for Nuffield Science Teaching Project. Incorporates 7 cm dia. screen with 10×10 division graticule, focus and brilliance controls and adjustable 'Y' gain and shift. The time base, adjustable from 1 milli-second to 1 second f.s.d., is automatically triggered. Provision is made for external 'X' input for display of Lissajous figures and connecting external time bases. For 110/125V and 210/250V 50/60 Hz single phase supplies. Dimensions 19×14×25 cm, weight 4 kg.
Each **£33·00** *f*



EF-940

EF-940

OSCILLOSCOPE, *EMI*, **Type 101,** suitable for use in physics, chemistry and electronics laboratories. Incorporates 7·5 cm dia. high resolution flat screen with 6×5 cm graticule, brilliance and astigmatism controls and adjustable 'Y' gain and shift. The time base, adjustable from 0·2 microsec/cm to 100 millisec/cm is internally or externally triggered. A 'Level' control adjusts the precise point of origin of a waveform. Includes eight internal calibration voltages. For 95/130 and 190/260V 50/60 Hz single phase and 12V d.c. supplies. Dimensions 23×22×28 cm, weight 8 kg ... ... Each **£170·00** *fN*

Items on this page normally available from stock except those coded *N*.

ELECTROCHEMICAL ANALYSIS

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CONDUCTIVITY BRIDGES

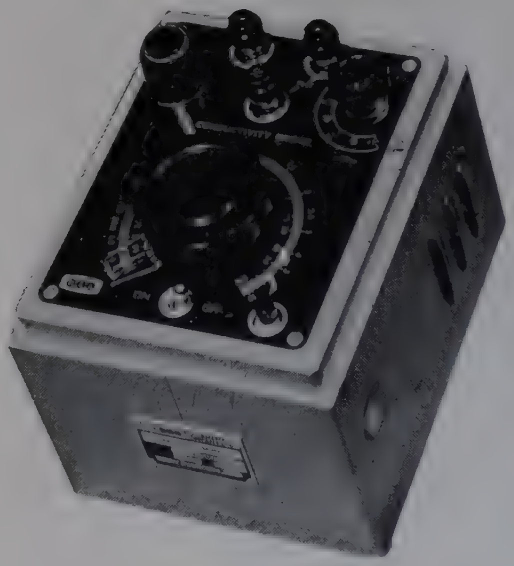
For testing water samples from boiler systems, condensers, rivers, etc., and for measuring concentrations of electrolytes in solution.

EJ-030

CONDUCTIVITY BRIDGE, *Pye Unicam,* **Type E7566/3, range 0·1 micromhos cm to 10 mhos.** A sensitive 'magic eye' cathode ray tube provides null point indication. To avoid polarisation effects the bridge circuit is supplied with a nominal 0·85V a.c. voltage.

Test frequency	50 Hz and 2·9 kHz dependent on range
Power consumption	12W
Overall dimensions	18·5×16×15·5 cm
Weight, net	3·6 kg

For 110/250V 40/100 Hz single phase supplies. Requires but does not include a conductivity cell. Each **£70·00** *fN*

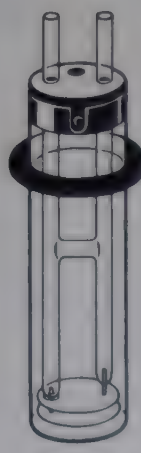


EJ-030

EJ-050

CONDUCTIVITY CELLS, uncalibrated, *Gallenkamp*
Borosilicate glass cells with bright platinum disk electrodes supported by ebonite covers.

Conductivity range	High	Medium	Low	
Electrode dia.	11	15	22 mm	
Electrode separation	10·5	7	3·5 mm	
Each	£12·20	14·25	21·85	*a*



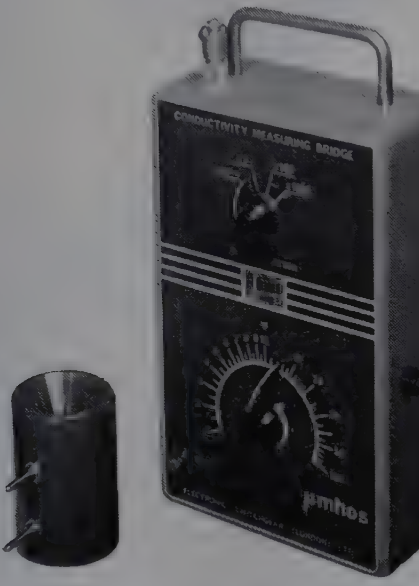
EJ-050

Items on this page normally available from stock except those coded *N.*

CONDUCTIVITY BRIDGES

(continued)

The following two instruments are battery operated and measurement is by an a.c. bridge, energised at low potential by a 1000 Hz oscillator. The combination of low potential and high frequency obviates errors due to polarisation within the conductivity cell. Using the cells provided, measurement is possible over the stated ranges in three switched steps. The range selector switch also has a test position at which the bridge calibration can be checked.



EJ-055

EJ-060

> **Conductivity meter,** *Dionic*, for water testing see WP-740 in List No. sequence.
>
> **Conductivity bridge,** for soil testing see SH-120 in List No. sequence.

EJ-055

CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC3, range 1 to 100,000 micromhos/cm,** as specification. A beaker type cell, which has a constant K=1·0 and a sample volume of approximately 12 ml, plugs into the side of the bridge. Complete with one cell CJ/10, cell cleaning brush, thermometer 0–50°C and plastics carrying case. With *Ever Ready* Type PP4 battery.

Overall dimensions 24 × 19 × 9 cm

Weight, net 2·3 kg ... ... Each **£42·00** *m*

REPLACEMENT PARTS

EJ-057	**Cell,** Type CJ/10, K=1·0	Each	**£8·00**	*f*
EJ-058	**Thermometer,** 0–50°C, without case...	Each	**£0·63**	*f*

EJ-060

CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC-1 Mk IV, range 0·1 to 100,000 micromhos/cm** as specification. Includes two conductivity cells EJ-084 having constants of 0·1 and 1·0 respectively. Temperature compensation facilities for dilute aqueous solutions (coeff 2% per deg C) are provided over the range 10 to 10,000 µmhos/cm. Outside this range or for other solutions the compensation coefficient is calculated from measurements made at two different temperatures. Complete with thermometer 0–50°C, cell cleaning brush, and instructions. With *Ever Ready* Type PP7 battery. **With carrying case.**

Overall dimensions 32 × 22 × 12 cm

Weight, net 3·6 kg ... ... Each **£77·00** *m*

REPLACEMENT PARTS AND ACCESSORY

EJ-068	**Thermometer,** 0–50°C in brass case ...	Each	**£1·05**	*f*
EJ-084	**Cells,** Type CB. For price see entry in List No. sequence.			

EJ-080

CONDUCTIVITY CELLS, type CCL, pipette type with rubber bulb. For prices see below.

EJ-081

CONDUCTIVITY CELL, type EFB, flow line type, ½ in bore with ½ in B.S.P. thread. For max. 100°C and 100 lbf/in^2 working, or use as a beaker with end fittings provided.

Cell constant K		0·1	1·0	
EJ-080	Each	**£13·00**	**12·00**	*fN*
EJ-081	Each	**£11·35**	**11·35**	*f*

EJ-084

CONDUCTIVITY CELL, type CB, general purpose beaker type. The cell has a funnel shaped entry to facilitate insertion of sample so that it is equally suitable for use with liquid sludges, wet soil samples and other similar materials. A removable base plug facilitates thorough cleaning. Sample volume approx. 12 ml.

Cell constant K	0·1	1·0	
Each	**£10·00**	**10·00**	*f*

When ordering any of above cells please specify constant required.

Items on this page normally available from stock except those coded *N*.

Gallenkamp ELECTRODEPOSITION ANALYSERS

with stationary electrodes and magnetic stirring for the estimation of any metal which can be determined gravimetrically after electrodeposition.

The electrodeposition analyser is made in two forms, a single and a three test unit, both of which have built-in magnetic stirrers and hotplates. The use of magnetic stirring in electrodeposition analysers has many advantages. Increased efficiency of agitation enables the metal to be deposited in two-thirds of the time compared with conventional apparatus, the space above the apparatus is left clear for the electrode holders, and spray during agitation is reduced to a minimum.

ANALYSER

Both analysers are bench mounting but the 3 test analyser is designed also to stand on the corresponding power supply unit. The analyser base is of rustproofed steel, finished in grey enamel. Inside this base are fitted the magnetic stirrer, speed control and energy regulator for the 12·5 cm diameter hotplate which is supported on the top of the base. The electrode holders, which are adjustable for height, are fitted on stainless steel rods at the rear of the analyser.

POWER SUPPLY UNIT

This comprises selenium full wave rectifiers and a double wound transformer in a ventilated metal case finished in stoved enamel. An ammeter and voltmeter are fitted in each circuit together with mains fuses and switch, and a variable resistance. Output from each circuit is 7A at 12V.

EJ-090

ELECTRODEPOSITION ANALYSERS, *Gallenkamp*, as specification, comprising stirrer/hotplates with speed controls, energy regulators, electrode support rods and holders. **Without d.c. power supply unit, beakers or electrodes.** For single phase supplies.

		1-test	3-test	
Base dimensions		23×16	23×52 cm	
For 200/240V 50 Hz	Each	**£36·00**	**107·00**	*b*
For 110/120V 60 Hz	Each	**£37·00**	**110·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

EJ-092	**Electrode holder,** complete with cable connection. Each	**£8·50**	*b*
SS-636	**Magnetic followers,** polypropylene, 25 mm and 45 mm. See entry in List No. sequence.		

EJ-095

POWER SUPPLY UNIT, *Gallenkamp*, as specification, with ammeter, voltmeter and rheostat and with output of 7A at 12V from each circuit. For single phase supplies.

		1-test	3-test	
Dimensions		45×30×23	83×60×35 cm	
For 200/250V 50 Hz	Each	**£62·00**	**164·00**	*g*
For 110/120V 60 Hz	Each	**£63·00**	**170·00**	*gN*

When ordering please state voltage and frequency of supply.

EJ-100

INNER ELECTRODE, anode, platinum gauze cylinder, 32×32×140 mm overall height ... Each **£83·00** *m*

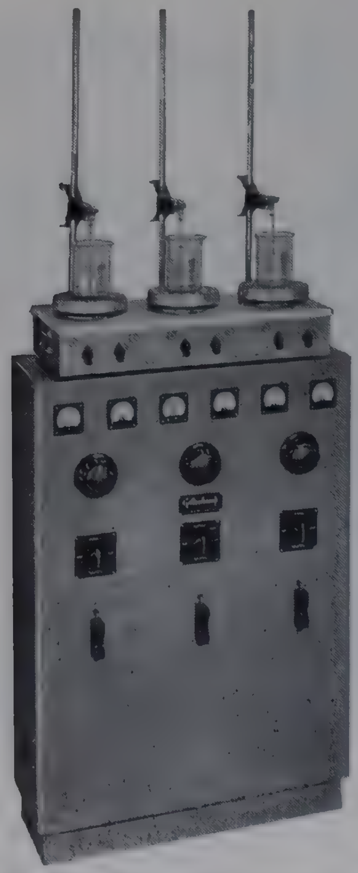
EJ-101

OUTER ELECTRODE, cathode, platinum gauze cylinder, 45×45×125 mm overall height. Each **£116·00** *m*

ACCESSORIES

BJ-655	**Beaker,** 250 ml, squat form. For price see entry in List No. sequence.				
EJ-105	**Beaker cover,** polythene, with slot to allow for entry of electrodes. Strongly recommended since it prevents the loss of solution from spray.	Ten **£4·60**	Each	**£0·51**	*b*

EJ-090, single test analyser with electrodes EJ-100 and EJ-101



EJ-090 three test analyser with power supply unit EJ-095

Items on this page normally available from stock except those coded *N*.

pH METERS

BUFFER POWDERS

EJ-275

BUFFER POWDERS, for standardisation of pH meters. Supplied in sachets. Each pH 4 and pH 9 sachet makes up 100 ml of buffer and each pH 7 sachet makes up 200 ml. With instructions.

pH value at 20°C	4·0	7·0	9·2	
Pack qty.	50	25	50 sachets	
10 packs	**£19·00**	**16·50**	**15·00**	c
Pack	**£ 2·15**	**1·85**	**1·70**	

pH
BALANCE
SELECTOR

EJ-312

'BIG SCALE' pH METER, MODEL 700

With a large clear scale and antiparallax mirror inset. Fitted with terminals for connecting to a recorder.

Technical Data

Range pH	0 – 14
Scale length	18 cm
divisions	0·1 pH
Discrimination	0·02 pH
Accuracy	0·02 pH
Temperature compensation	0 – 100°C by conversion chart
Dimensions	19·5×16×9 cm
Weight	2·3 kg

EJ-312

'BIG SCALE' pH METER, *Analytical Measurements*, as specification, complete with pH probe unit, buffer and KCl kit. For 230/250V 50/60 Hz supplies.
Each **£54·00** *f*

When ordering please state voltage and frequency of supply.

pH
Portable pH meter
Model 30C

EJ-460

PORTABLE pH METER

A battery operated instrument of high stability suitable for field and laboratory use.

Technical Data

Ranges	0 to 8 pH, 6 to 14 pH 0 to 800 mV, 600 to 1400 mV
Subdivisions	0·1 pH
Discrimination	0·05 pH
Accuracy	±0·1 pH or ±10 mV
Stability	0·05 pH/day or 3 mV/day after 1 hour warm up period
Temperature compensation	0–100°C automatic
Dimensions	18·5×14×8·5 cm
Weight	1·3 kg

EJ-460

pH METER, PORTABLE, *E.I.L.* **Model 30C,** as specification, with combination electrode, resistance thermometer, *Ever Ready* battery PP9 and carrying case complete with wash bottle, beaker and buffer solution container ... ... Each **£89·00** *f*

REPLACEMENT PARTS

EJ-464	Combination electrode SHDN33/C ...	Each	£8·00	*f*
EJ-468	Resistance thermometer T30B ...	Each	£6·00	*f*

ACCESSORY

EJ-275	Buffer powders. For details and prices see entry in List No. sequence.

All items on this page normally available from stock.

LABORATORY pH METER Model 23A

A well established mains operated meter covering the range 0 to 14 pH readable to 0·02 pH.

The meter is an ultra-stable d.c. amplifier with high input resistance. A voltage stabiliser smooths out line voltage fluctuations and the circuit is designed to ensure that calibrations are independent of ageing and replacement. Calibration may be checked and readjusted readily without disturbing the electrodes.

Output terminals are fitted for connection to a potentiometric recorder or a remote indicating meter or both. Scale expansion is possible by using a sensitive recorder and shunting resistors. **Details of this method and the apparatus required are available on application.**

Many different electrodes are available for mounting on an adjustable head fitted to a stand with rectangular base.

Technical Data

Ranges pH	0 – 14 subdivided to 0·1 pH by ranges ± 3·5 pH about preselected values
mV	0 – 800 subdivided to 10 mV
Accuracy	± 0·05 pH
Discrimination	± 0·02 pH
Zero drift	± 0·02 pH over 24 hours
Temperature compensation	0 – 100°C on all ranges
Recorder output	1·4 mA into 200Ω
Dimensions	40×30×25 cm
Weight	12·7 kg

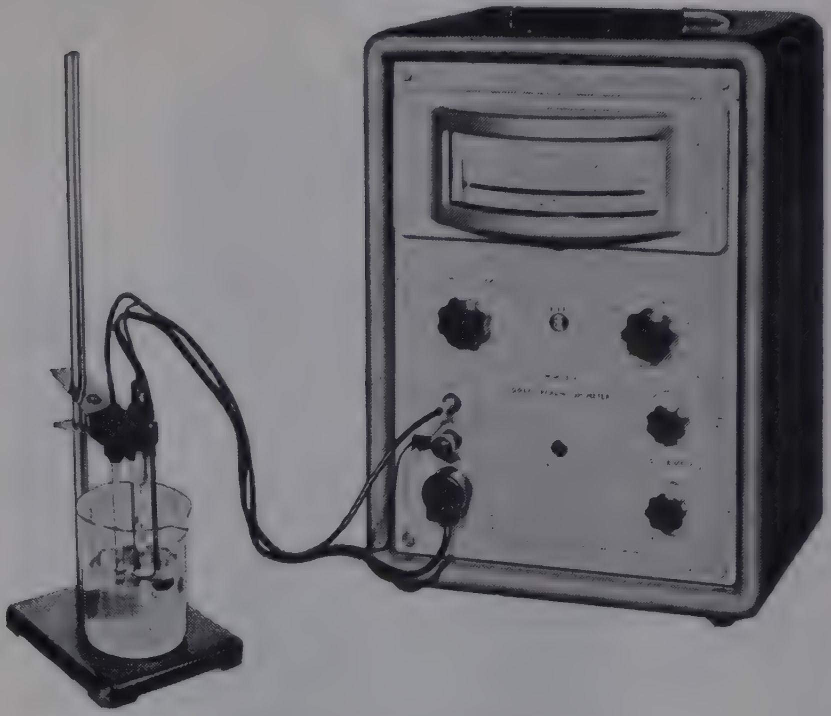
EJ-515

pH METER, *E.I.L.* **Model 23A,** as specification. For 200/250V 50/60 Hz supplies. **Without electrodes, resistance thermometer or stand.**
Each **£130·00** *f*

Also available for 100/130V a.c. to order.

ACCESSORIES

EJ-518	**Dummy thermometer plug,** to enable the pH meter to be used without resistance thermometer. Temperature equivalent 25°C.	Each	**£5·00**	*f*
EJ-519	**Dummy thermometer plug,** as EJ-518 but with temperature equivalent of 37°C.	Each	**£5·00**	*f*



EJ-515 with EJ-520, EJ-522 and electrodes

EJ-520	**Resistance thermometer,** for fully automatic compensation of temperature effects. With 90 cm lead and five-pin plug ...	Each	**£7·00**	*f*
EJ-522	**Stand,** with adjustable head, for mounting electrodes and resistance thermometers.	Each	**£4·00**	*f*
EJ-526	**Millivolt adapter,** to convert banana socket to terminal for use with metal or hydrogen electrodes	Each	**£1·00**	*f*
EJ-275	**Buffer powders,** for pH meter standardisation. For prices see entry in List No. sequence.			

ELECTRODES, *E.I.L.*, with 90 cm leads for use with pH meter EJ-515. All the glass electrodes terminate in a banana plug, whilst the reference and metal electrodes are fitted with spade terminals. See tabulation below.

Details of other *E.I.L.* **electrodes on application.**

List No.	Ref. No.	Type	pH range	Temp. °C	Stem dia. mm	Length cm	Character	Each £	
EJ-532	GHS23/B	Glass	0 – 14	10 – 140	10	12·5	All-purpose	**3·40**	*f*
EJ-536	GS23/B	Glass	1 – 9·5	10 – 45	6	12·5	Spearhead	**3·40**	*f*
EJ-540	RJ23/1	Reference			15	15	Ceramic plug	**3·60**	*f*
EJ-550	EPT23	Platinum			6	12·5	Foil	**4·40**	*f*
EJ-552	EW23	Tungsten			6	12·5	Rod	**6·70**	*f*
EJ-556	ESB23	Antimony			6	12·5	Button	**6·70**	*f*
EJ-558	EAG23	Silver			6	12·5	Foil	**4·40**	*f*

All items on this page normally available from stock.

LABORATORY pH METER Model 38B

An inexpensive instrument with overlapping ranges covering 0–8 pH and 6–14 pH which avoids having to switch scales as the sample solution changes from acid to alkali or vice versa. A feature of the meter is the provision of both auto and manual temperature compensation.
The instrument covers also potential ranges from 0 to 1400 mV in the same two scales 0–800 mV and 600–1400 mV.
It is provided with a swing-out electrode clamp which is particularly convenient for titration work. Sockets are provided for chart recorder operation.

pH
E.I.L. MODEL 38A pH. METER

EJ-622

Technical Data

Ranges pH	0–8 and 6–14
mV	0–800 and 600–1400
Accuracy	±0·1 pH or ±10 mV
Discrimination	0·02 pH or 2 mV
Stability	0·05 pH/day or 3 mV/day after 1 hour warm up period
Input resistance	suitable for electrodes of up to 1000 MΩ
Temperature compensation	0–100°C manual (automatic with resistance thermometer accessory)
Recorder output	10 mV into 20Ω
Dimensions	22×24×16 cm
Weight	3·6 kg

EJ-622

pH Meter, *E.I.L.* **Model 38B,** as specification, complete with glass electrode, range 0–14 pH and reference electrode but without resistance thermometer. For 100/250V 40/60 Hz supplies ... ... Each **£90·00** *f*

ACCESSORY

EJ-468 **Resistance thermometer.** For price see entry in List No. sequence.

LABORATORY pH METER Model 46A

This instrument is designed round the *E.I.L. Vibret* vibrating capacitor modulator. The Vibret is extremely robust and simple and avoids the problems associated with an electrometer input valve. The wide scale and carefully grouped controls ensure maximum ease of operating and reading. Together with a 0–14 pH scale, a second scale of 2·8 pH is provided which can be offset in steps of 2 pH from 0–12 pH, so expanding the scale by a factor of more than six. Both pH and redox measurements may be made with rapid changeover from the one to the other. An output socket makes continuous recording possible and also provides a means of connecting with a special 1·4 pH span expanded scale meter for measurements of the highest accuracy.

EJ-630

Technical Data

Ranges pH	0–14 pH, 0–2·8 pH with back-off in 2 pH steps
mV	0–1400 mV, 0–280 mV with back-off in 200 mV steps
Accuracy	wide range ±0·05 pH or ±5 mV narrow ranges ±0·01 pH or ±1 mV
Stability	about 0·005 pH or 0·25 mV/day
Input resistance	suitable for electrodes of up to 1000 MΩ
Temperature compensation	fully automatic 0–100°C for zero and slope
Recorder output	1·4 mA into 5 kΩ
Dimensions	36×26×21 cm
Weight	6·8 kg

EJ-630

pH METER, *E.I.L.* **Vibret Model 46A,** as specification, complete with glass electrode, range 0–14 pH and reference electrode and dust cover. For 100/120 or 200/250V 50 Hz supplies ... ... Each **£209·60** *fN*

(Model for 60 Hz supplies available to special order).

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

PORTABLE pH METER Model 293

A battery operated direct reading pH meter with solid state circuitry. The instrument must be used with E_07 electrodes.

Technical Data

Ranges	0 to 14 pH ±700 mV
Meter	125 mm scale with subdivisions of 0·1 pH and 10 mV
Drift	Less than 0·05 pH/24 hours
Temperature compensation	Manual 0 to 100°C Automatic 0 to 100°C with resistance thermometer accessory
Power supply	2×4V *Mallory* long life batteries
Dimensions	220×190×90 mm
Weight	6 kg

pH
Pye Model 293 pH Meter
PYE UNICAM
Stand By
Battery Check
Off
pH
mV
Temperature °C
Asymmetry

EJ-645

EJ-645

pH METER, *Pye Unicam* **Model 293**, as specification, complete with type 450 E7 combined glass and reference electrode and batteries but without resistance thermometer or buffer powders ... ... Each **£60·00** *f*

REPLACEMENT PART

EJ-703 **Combined electrode**, polythene sheathed, type 450 E7. For details and price see entry in List No. sequence.

ACCESSORIES

EJ-657 **Resistance thermometer**, type 625 ... ...
EJ-275 **Buffer powders** ... ...
} For details and prices see entries in List No. sequence.

LABORATORY pH METER Model 290

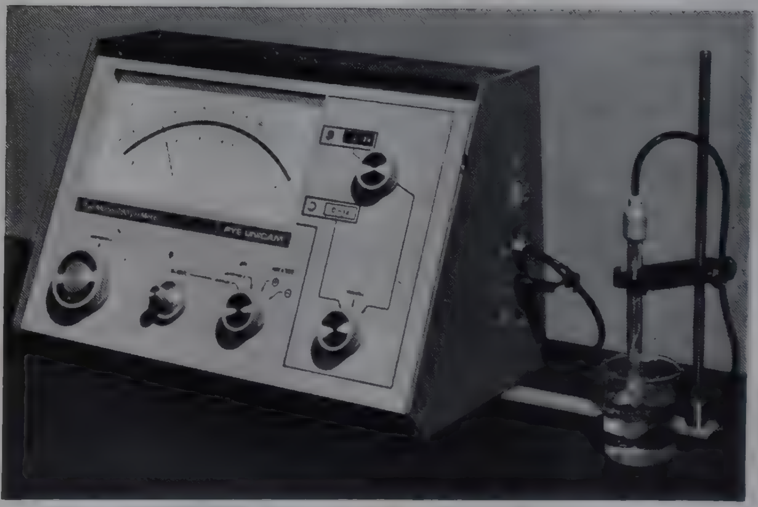
A sensitive and very rugged pH meter, with a wide scale meter and having normal and expanded ranges and temperature compensation. The display meter has a taut band suspension and an 185 mm scale which is clearly graduated in mV and pH units. The instrument must be used only with E_07 electrodes. Outputs are provided for chart recorder operation.

A most important feature of the instrument is its very high long term stability.

The controls are simple and clearly labelled. Indicator lamps show at a glance whether the instrument is on stand-by, full range or expanded range.

Technical Data

Ranges	0 to 14 pH and 14 expanded ranges of 1·4 pH 0 to ±1400 mV and 14 expanded ranges of ±140 mV.
Meter	185 mm scale with sub-divisions of 0·01 pH and 1·0 mV
Drift	Less than 0·002 pH/24 hours
Discrimination	0·002 pH or 0·2 mV
Output	±700μA on all ranges
Input impedance	5×10^{12} ohms
Input current	Less than 10^{-13} amps
Temperature compensation	Manual 0 to 100°C with scale sub-divided 0·1°C Automatic −5 to 100°C with resistance thermometer accessory
Earthed solution	Equally suitable for earthed and unearthed solutions
Power supply	100/120 and 200/250V 50/60 Hz
Dimensions	394×216×254 mm
Weight	8·5 kg



EJ-655

EJ-655

pH METER, *Pye Unicam* **Model 290**, as specification, complete with type 401 E7 combined glass and reference electrode EJ-700, integral electrode stand and holder, jack plug and coaxial adapter but without resistance thermometer or buffer powders ... ... Each **£179·00** *f*

REPLACEMENT PART

EJ-700 **Combined electrode**, type 401 E7. For details and price see entry in List No. sequence.

ACCESSORIES

EJ-657 **Resistance thermometer, type 625**, for temperature auto-compensation ... ... Each **£7·70** *f*

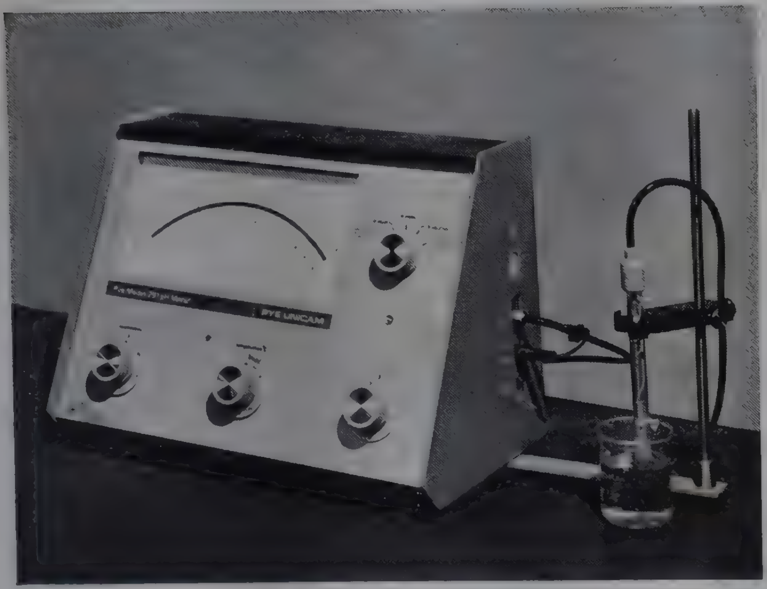
EJ-275 **Buffer powders** ... ...
EJ-702 **Combined miniature electrode** ...
EJ-704 **Glass electrode** ... ...
EJ-710 **Reference electrode** ... ...
} For details and prices see entries in List No. sequence.

All items on this page normally available from stock.

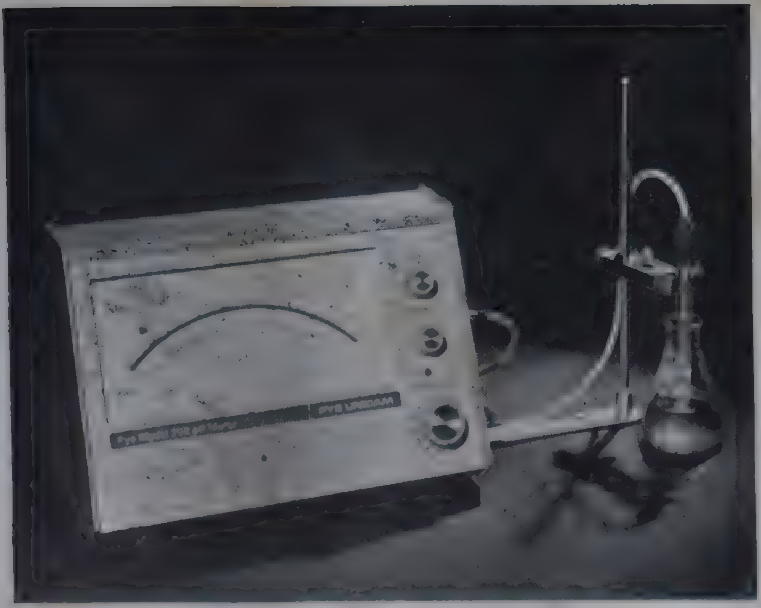
LABORATORY pH METERS Models 291 and 292

Both instruments use solid state circuitry and are simple to operate and to read. Their centre zero (pH7) taut band suspension meter combines stability with sensitivity and the 185 mm mirror backed scale with knife edge pointer may be read with equal accuracy from sitting or standing positions.

Standard models are supplied with manual temperature compensation but the resistance thermometer accessory converts either model to temperature auto-compensation. A valve voltmeter of excellent long term stability practically eliminates drift. Both meters are equally suitable for use with earthed or isolated solutions but must be used with $E_0$7 electrodes.



EJ-675



EJ-685

MODEL 291

Technical Data

Ranges	0 to 14 pH and an expanded range of 2·8 pH for f.s.d. 0 to 1400 mV and an expanded range of 280 mV for f.s.d.
Meter	185 mm scale with sub-divisions of 0·1 pH and 10 mV
Discrimination	0·005 pH or 0·5 mV
Drift	Less than 0·002 pH/24 hrs.
Temperature compensation	Manual 0 to 100°C Automatic −5 to 100°C with resistance thermometer accessory
Input impedance	5×10^{12} ohms
Power supply	100/120V and 200/250V 50/60 Hz
Dimensions	360 × 216 × 254 mm
Weight	6·5 kg

EJ-675

pH METER, *Pye Unicam* **Model 291,** as specification, complete with combined glass and reference electrode EJ-700, integral electrode stand and holder, jack plug and coazial adapter but without resistance thermometer or buffer powders ... ... Each **£130·00** *f*

REPLACEMENT PART AND ACCESSORIES, see below.

MODEL 292

Technical Data

Range	0 to 14 pH ±700 mV
Meter	185 mm scale with sub-divisions of 0·1 pH and 10 mV
Discrimination	0·02 pH or 2 mV
Drift	Less than 0·002 pH/24 hrs.
Temperature compensation	Manual 0 to 100°C Automatic −5 to 100°C with resistance thermometer accessory
Input impedance	10^{12} ohms
Power supply	200/250V 50/60 Hz (100/120V 50/60 Hz to special order)
Dimensions	285 × 165 × 203 mm
Weight	4·8 kg

EJ-685

pH METER, *Pye Unicam* **Model 292,** as specification, complete with combined glass and reference electrode EJ-700, integral electrode stand and holder, jack plug and coaxial adapter but without resistance thermometer or buffer powders ... ... Each **£77·00** *f*

REPLACEMENT PART for EJ-675 and EJ-685

EJ-700	Combined electrode, type 401 E7. For details and price see entry in List No. sequence

ACCESSORIES for EJ-675 and EJ-685

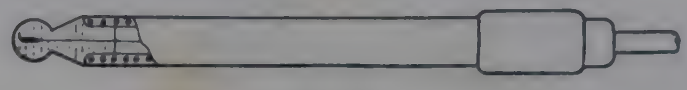
EJ-657	Resistance thermometer, type 625 ...	For details and prices see entries in List No. sequence.
EJ-275	Buffer powders	
EJ-702	Combined miniature electrode ...	
EJ-704	Glass electrode	
EJ-720	Reference electrode	

All items on this page normally available from stock.

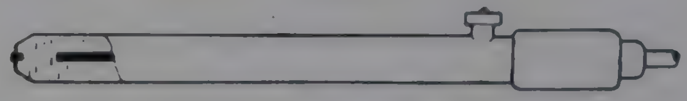
ELECTRODES FOR pH METERS

(Manufactured by Pye Unicam Ltd., under licence from Dr. W. Ingold, Zurich)

Pye Unicam Ingold electrodes for the Models 290, 291, 292 and 293 pH meters have electrical null points (E_0 values) at pH7. The E_0 value is the pH at which the glass and reference electrodes give zero output. E_07 electrodes are superior to the conventional E_02 electrodes in that they have increased shelf lives and improved high temperature performances.



EJ-700



EJ-710

List No.	Type No.	pH range	Temp. range °C	Stem dia. mm	Length mm	Description	Each	
							£	
EJ-700	401 E7	0—12	10 to 70	12	120	Combined glass bulb electrode and silver/silver chloride reference electrode.	7·20	*f*
EJ-702	401 M5E7	0—12	10 to 70	5	120	Combined glass bulb electrode and silver/silver chloride reference electrode, miniature pattern.	8·75	*f*
EJ-703	450 E7	0—12	10 to 70	18	105	A combined glass bulb and silver/silver chloride reference electrode sheathed in polythene.	7·20	*f*
EJ-704	201 E7	0—12	10 to 70	12	120	Glass bulb electrode.	5·50	*f*
EJ-710	303	—	0 to 70	12	120	Calomel reference electrode with porous ceramic plug tip.	4·60	*f*

Gallenkamp
REGD. TRADE MARK

TITRATION BENCHES

PNEUMATIC AND GRAVITY FILLING MODELS

- **Shadowless, evenly illuminated work tops and viewing backs**
- **Positions for up to 6 burettes on each bench**
- **All benches 3 ft 6 in wide, 1 ft 9 in deep with work top 3 ft high**

For full details and prices see FV-150 to FV-173 in List No. sequence.

FV-153 with burettes

All items on this page normally available from stock.

AUTOTITRATOR CONTROLLER

The *Pye Unicam* **Autotitrator Controller** comprises two independent amplifiers with built-in change-over relays to link a pH meter to delivery control devices such as titrant valves and flow controllers or to alarm circuits.

It is suitable for use with pH meters EJ-655, EJ-675 and EJ-685 or other meters having 100 μA/pH output.

For most applications the **Delivery Unit** is suitable as the means of controlling flow.

channel 1
start
finish
titrant
acid
alkali
manual
channel 2
start
finish
autotitrator
controller
titrant
acid
alkali
manual
standby
run

EJ-775

For automatic titration

The combination of pH Meter, Autotitrator Controller and Delivery Unit (see assembly below) is suitable for any titration in which the end point can be detected by an electrode system. One channel is used to control fast and the other to control slow delivery rates.

For pH control

In this case, the combination used with acid and alkali reservoirs is arranged so that one channel controls the addition of acid and the other of alkali. The pH of any process can thus be maintained constant.

EJ-775

AUTOTITRATOR CONTROLLER, *Pye Unicam.* Input resistance 400 ohm. Input current 0 to 1400 or 700-0-700μA. Relay contact ratings 250V a.c. 5A non-inductive. **Without pH meter or delivery unit.** Dimensions 305 × 153 × 254 mm. Weight 7 kg. For 110/120 and 200/250V 50/60 Hz supplies. Each **£60·00** f

EJ-782

DELIVERY UNIT, *Pye Unicam*, comprising two electrically operated valves in a sealed plastics case. Flow rates from 0·1 to 2 ml/sec are controlled by external glass stopcocks. Dimensions 230 × 90 × 230 mm. Weight 3·7 kg. For 110/120 or 200/250V 50/60 Hz supplies. Each **£38·00** f

When ordering please state voltage and frequency of supply.

EJ-920 with burette and electrodes

AUTOMATIC TITRATION ASSEMBLY

A suitable assembly for automating all normal routine laboratory pH titrations.

The following components are recommended:

EJ-655 **or** **EJ-675** **or** **EJ-685**	pH meter with suitable electrodes
EJ-775	Autotitrator controller
EJ-782	Delivery unit
EJ-920 **or** **EJ-925**	Titration stand assembly with or without hotplate
BW-044	Burette

For full specifications and prices see entries in List No. sequence.

Gallenkamp TITRATION POTENTIOMETER

Manufactured under licence from Kodak Ltd.

A versatile robust potentiometer for routine industrial and educational applications using most common electrodes excluding glass pH electrodes.

- Suitable for potentiometric, differential or dead-stop titrations
- Transistor circuit suitable for most common electrodes except glass pH electrodes
- Very stable performance—long battery life
- Simple to operate, calibration adjustment provided
- Sensitive moving coil null meter

Gallenkamp
TITRATION POTENTIOMETER
made under licence from KODAK Ltd
potentiometric
differential
dead stop
off
titration
sensitivity
balance
volts x 0·1
calibration
ext
meter
MADE IN ENGLAND

EJ-890

PERFORMANCE AND OPERATION

This self contained, battery operated, portable potentiometer has been proved by years of industrial operation. Based on a sensitive transistor circuit, the instrument has an input impedance high enough to suit most common electrodes **with the exception of glass pH electrodes.** The potentiometer dial is calibrated from 0 to 1V in 10 mV subdivisions and out of balance voltages down to 2 mV are detectable. A single switch selects the type of titration function required and controls are fitted for potentiometer calibration, the out of balance detector sensitivity and null point. A socket is provided for connecting an external meter of higher sensitivity than that of the built-in meter.

CONSTRUCTION AND DIMENSIONS

The null meter, controls, printed circuit and batteries are housed within a strong die-cast aluminium alloy case. The unit is equally suitable for horizontal or vertical operation.

	H	W	D
Dimensions	12 ×	19 ×	10 cm
Weight	1·0 kg		

EJ-890

TITRATION POTENTIOMETER, *Gallenkamp*, transistorised, as specification, range 0 to 1V, with built-in null meter and three batteries, *Mallory* Type Mn 1400.
Each **£21·00** *b*

ACCESSORIES

EF-490	**Battery, voltage reference,** *Mallory*, for potentiometer calibration ... ...
EJ-540	**Electrode,** reference ... ...
EJ-550	**Electrode,** platinum ... ...
EJ-552	**Electrode,** tungsten ... ...
EJ-556	**Electrode,** antimony ... ...
EJ-558	**Electrode,** silver ... ...
EJ-920	**Titration stand assembly,** unheated ... ...
EJ-925	**Titration stand assembly,** heated
SS-626 et seq.	**Magnetic followers,** glass, polypropylene and ptfe encased ... ...

For details and prices see entries in List No. sequence.

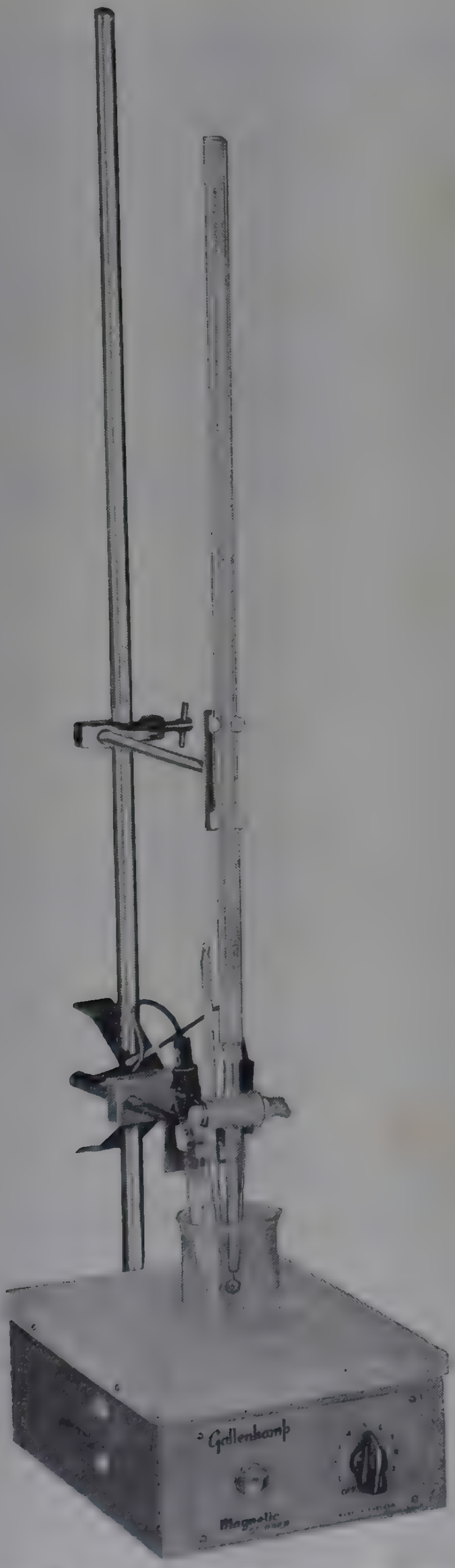
All items on this page normally available from stock.

Gallenkamp TITRATION STAND ASSEMBLIES

For electrometric titrations at ambient or elevated temperatures.

- **Efficient variable magnetic stirring**
- **Convenient and quick to use**
- **Accepts standard electrodes, burettes and thermometers**

One assembly is based on an unheated magnetic stirrer, the other on a magnetic stirrer with hotplate. The stirring speeds of both are variable and each assembly is fitted with a burette holder for burettes of capacities 5 cm³ to 25 cm³. The electrode holder with quick release bosshead enables the electrodes to be lifted clear of the titration vessel between tests.



EJ-920 with burette and electrodes

EJ-920

TITRATION STAND ASSEMBLY, *Gallenkamp*, **unheated,** as specification, for **ambient temperature titrations.** Comprising:

SM-452	Support rod, stainless steel, size D.
SM-635	Bosshead.
SM-637	Bosshead, quick release.
SM-682	Burette holder, 10 mm clips.
SM-683	Electrode/thermometer holder.
SS-610	Magnetic stirrer.

For 200/240V 50 Hz single phase supplies.
Assembly **£20·00** *b*

For 100/120V 60 Hz single phase supplies.
Assembly **£20·50** *bN*

When ordering please state voltage and frequency of supply.

EJ-925

TITRATION STAND ASSEMBLY, *Gallenkamp*, **heated,** as specification, for **ambient and higher temperature titrations.** Comprising:

SM-452	Support rod, stainless steel, size D.
SM-635	Bosshead.
SM-637	Bosshead, quick release.
SM-682	Burette holder, 10 mm clips.
SM-683	Electrode/thermometer holder.
SS-615	Magnetic stirrer/hotplate.

For 200/240V 50 Hz single phase supplies.
Assembly **£29·50** *b*

For 100/120V 60 Hz single phase supplies.
Assembly **£30·00** *bN*

When ordering please state voltage and frequency of supply.

ACCESSORIES for EJ-920 and EJ-925

SM-682	**Burette holder with 6 mm clips for 1 and 2 cm³ burettes and 13 mm clips for 50 cm³ burettes ... ...**	**For details and prices see entries in List No. sequence.**
SS-630	**Magnetic followers, glass ... ...**	
SS-634	**Magnetic followers, ptfe... ... ...**	
SS-636	**Magnetic followers, polypropylene ...**	

For suitable pH meters and electrodes see pages 222 to 229. Other accessories will be found under page headings Beakers and Burettes. See also SS-618 Magnetic stirrer/hotplate with thermostatic control.

Items on this page normally available from stock except those coded *N.*

Gallenkamp
REGD TRADE MARK

POTENTIOMETRIC MICROTITRATION APPARATUS

For multiple, routine determinations of chloride in plasma, serum, cerebro-spinal fluids and urine, and for determinations of salinity.

FEATURES

- **Only 0·2 cm³ sample used**
- **Results direct in mE/litre**
- **1% accuracy**
- **Uses only two standard solutions—no indicators**
- **More rapid than other methods**

The apparatus was designed in collaboration with Professor I. D. P. Wootton, Ph.D., M.A., M.B., B.Chir., F.R.I.C. and is described in 'Micro-Analysis in Medical Biochemistry,' 3rd ed. by E. J. King and I. D. P. Wootton. See also Laboratory Equipment Test Report No. 35 'Laboratory Practice,' 8, 1959, 11.

POTENTIOMETER

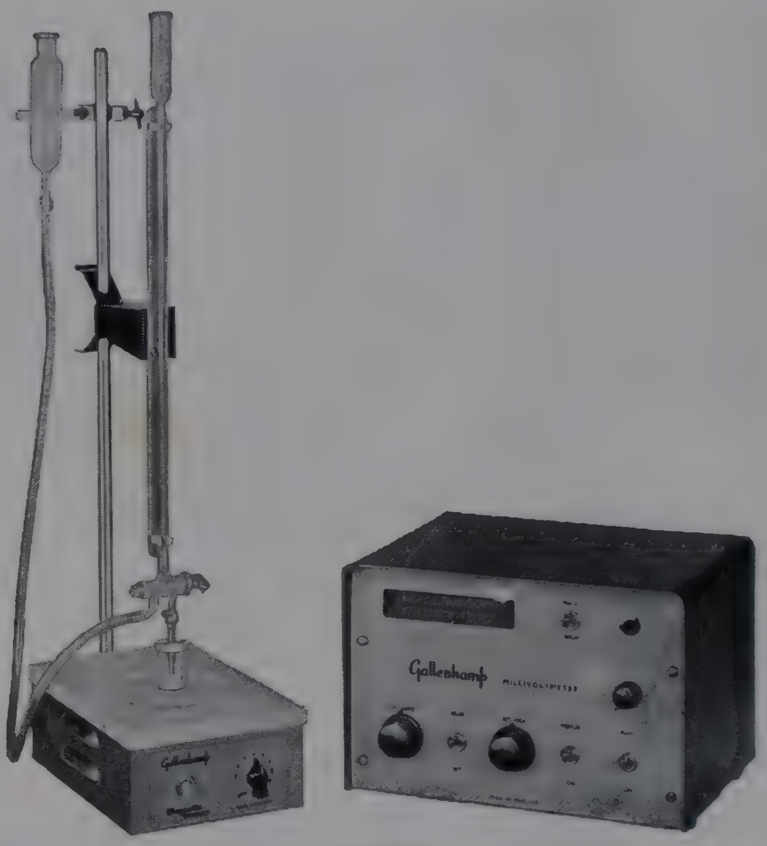
An orthodox double triode valve millivoltmeter with stabilised power supply. The built-in indicator is a taut suspension, short period galvanometer of very rugged construction, which is entirely free from sticking. Controls provide for adjustment of mechanical zero of the galvanometer, setting the electrical zero of the electronic circuit, adjusting the gain for scale width, and switching on the stirrer in the stand.

STAND

A variable speed magnetic stirrer which can be stopped and started from the potentiometer is fitted with a quick release burette holder and clamp for a reagent reservoir. The burette holder has a back plate with engraved vertical line for accurate burette reading.

BURETTE

A 5 cm³ burette, sub-divided in 0·02 cm³, with extra fine jet to minimise back-diffusion. To allow titrations to be carried out in a 10 ml beaker the burette has a sealed-in platinum electrode and a silver electrode alongside the jet. A double-bore stopcock with side arm allows filling from the reservoir.



EJ-930

EJ-930

POTENTIOMETRIC MICROTITRATION APPARATUS, *Gallenkamp*, as specification, comprising:

EJ-932	Potentiometer	EJ-946	10 Followers, magnetic, 10 mm, polythene covered
EJ-935	Burette holder	MK-055	12 Beakers, 10 ml
EJ-936	Burette	SM-635	Bosshead
EJ-937	Reservoir, 15 ml	SM-680	Clamp, 20 mm
EJ-938	Silver wire	SS-610	Magnetic stirrer

For 220/240V 50 Hz single phase supplies. Each **£155·00** *g*

For 200/210V 50 Hz single phase supplies. Each **£155·50** *gN*

For 100/120V 60 Hz single phase supplies. Each **£155·50** *gN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

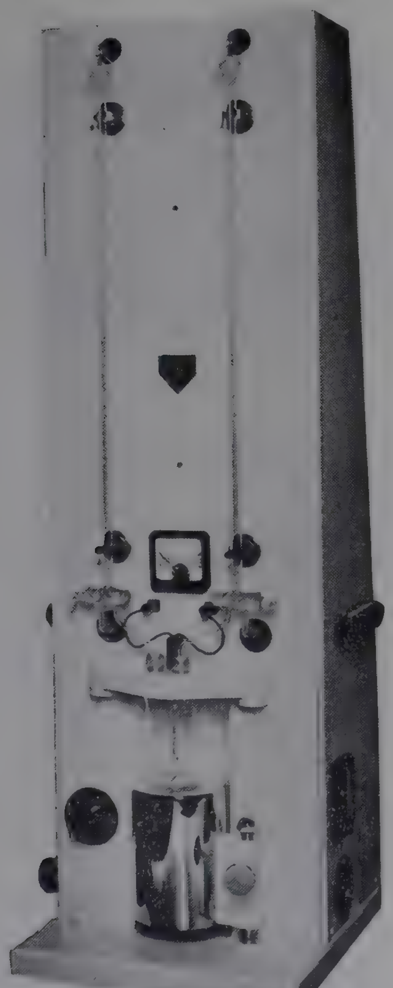
EJ-932	**Potentiometer,** as specification ...	Each	£125·00	*g*
EJ-935	**Burette holder and backplate assembly complete with mounting rod**	Each	£9·50	*b*
EJ-936	**Burette,** as specification...	Each	£4·65	*a*
EJ-937	**Reservoir,** 15 ml	Each	£0·75	*a*
EJ-938	**Silver wire,** 25 cm, for electrodes ...	Each	£0·35	*g*
MK-055	**Beaker,** glass, 10 ml.	For details and prices see entries in List No. sequence.		
SS-610	**Magnetic stirrer**			
EJ-946	**Follower,** magnetic, 10 mm, polythene covered.	Pack of 10	£0·40	*b*

Items on this page normally available from stock except those coded *N*.

KARL FISCHER ELECTROMETRIC APPARATUS

FOR MOISTURE DETERMINATIONS

The Karl Fischer method for the estimation of water utilizes the reaction of the water with iodine and sulphur dioxide in the presence of pyridine. In principle the electrical system of the electrometric apparatus comprises a pair of platinum electrodes, polarised by an applied e.m.f. In the presence of excess water and spent reagent, the anode is depolarised while the cathode remains polarised. As the gas film surrounding the cathode prevents current passing, the low resistance galvanometer, which effectively shunts the electrodes, registers a deflection. Addition of reagent in slight excess causes the cathode to depolarise and so register the end point as zero on the galvanometer. To achieve more accurate results, the back titration technique may be employed.



EJ-960

EJ-980

WATER DETERMINATION

Other apparatus will be found under the page headings shown below.

DEAN and STARK METHOD	see	**Water Determination**
INFRARED BALANCE	see	**Moisture**
MOISTURE EXTRACTION OVEN	see	**Ovens**

MAINS OPERATED

KARL FISCHER ELECTROMETRIC APPARATUS

A self-contained instrument incorporating a highly sensitive end-point indicating circuit. This apparatus conforms to BS 2511, the glass parts comprising two 25 cm³ burettes, two reagent reservoirs, two reservoir filling funnels, five desiccant guard tubes and a vacuum control stopcock. Other parts are a standard glass titration vessel with adjustable magnetic stirring, an indicating micro-ammeter with its scale marked 'Excess Water' and 'Excess Fischer' and sockets and terminals for the platinum electrodes. Nitrogen drying nozzles are fitted.

EJ-960

KARL FISCHER ELECTROMETRIC APPARATUS, *BTL*, to BS 2511, for the determination of moisture, as specification. For 110/120, 200/220 or 230/250V a.c. supplies. **Without chemicals**... ... Each **£173·25** *f*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

EJ-962	**Titration vessel**, standard	Each	**£1·20**	*f*
EJ-964	**Twin platinum electrode**	Each	**£4·20**	*f*
EJ-966	**Burette**, 25 cm³, right side	Each	**£4·07**	*f*
EJ-967	**Burette**, 25 cm³, left side	Each	**£4·07**	*f*

ACCESSORIES

EJ-972	**Titration vessel**, with side tube for filling and rubber cap	Each	**£1·77**	*f*
EJ-973	**Titration vessel**, as EJ-972 but with draining tube and stopcock	Each	**£3·50**	*f*

BATTERY OPERATED

KARL FISCHER ELECTROMETRIC APPARATUS

A self-contained instrument using a jet of dry nitrogen to agitate the contents of the titration vessel. This apparatus is based on a method described by Bonner, the glass parts comprising a 25 cm³ burette with a double-bore stopcock, three drying bottles and a titration vessel. The latter has four tubulures for the introduction of the nitrogen stream, the tip of the burette containing reagent, the twin platinum electrode glass sheath and the sample by a pipette or hypodermic syringe. Other parts are a blowing bulb, clips to take a standard 500 ml bottle of *BDH* Fischer reagent, a battery operated potentiometer and an indicating microammeter.

EJ-980

KARL FISCHER ELECTROMETRIC APPARATUS, *T & M*, for the determination of moisture, as specification. **Without chemicals** ... ... Each **£43·30** *fS*

REPLACEMENT PARTS

EJ-982	**Titration vessel**, without electrodes ...	Each	**£4·05**	*fS*
EJ-984	**Twin platinum electrode**, in glass sheath.	Each	**£0·90**	*fS*
EJ-985	**Burette**, 25 cm³	Each	**£1·50**	*fS*

Items on this page coded S normally available from stock.

GENERAL PURPOSE POLAROGRAPH

A simple but accurate polarograph for use with a galvanometer or a potentiometric recorder.

POLARISING POTENTIAL

The motor driven slide wire potentiometer is graduated from +0·4 to −1·4V at 10 mV intervals. This range can be doubled to give +0·8 to −2·8V or −1V may be added to give −0·6 to −2·4V. There is provision for standardising the slide wire current.

MEASUREMENT OF CELL CURRENT

The current from the dropping mercury electrode may be read on a high sensitivity spot galvanometer. The sensitivity of the polarograph is variable in ten steps covering total range 1/1 to 1/50; maximum sensitivity with a spot galvanometer being about 1 μA full scale deflection.

CONTROLS

Damping is adjustable and terminals are fitted for connection to the dropping mercury electrode and to the current measuring device.

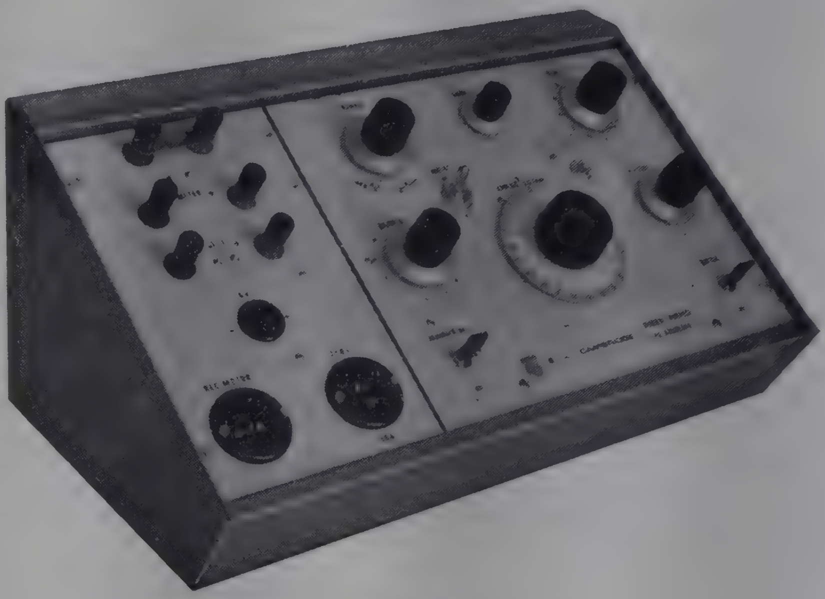
EK-100
POLAROGRAPH, general purpose, *E.I.L.*, as specification, without dropping mercury electrode or galvanometer. Overall dimensions 39×19×23 cm, weight 4·6 kg. Requires a 6V d.c. source and a 200/250V 50 Hz single phase supply ... ... Each **£175·00** *f*

When ordering please state voltage and frequency of supply.

ACCESSORIES

EK-105 **Dropping mercury electrode,** with 2 ml cell, mounted on electrode stand ... ... Each **£44·00** *f*

EK-108 **Reflecting galvanometer,** spot model, 450 ohm coil, lamp for 200/250V 50 Hz single phase supplies. Each **£28·00** *f*


EK-100

Gallenkamp APPARATUS FOR ENVIRONMENTAL TESTING

OV-700

HUMIDITY OVENS

OV-700
Steam Injection Type Oven to BS 3898, available with a range of accessories and programme control systems.

Also

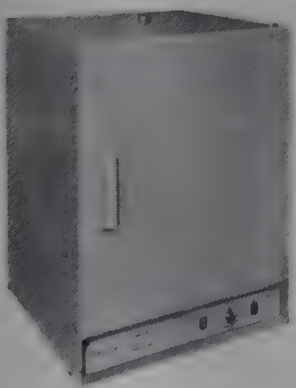
OV-600
Non-Injection Type Oven with salt tray humidifier.

FR-770

FURNACES

FR-770
Box Furnaces, 1500°C for research into the behaviour of metals, ceramics and other materials in air at high temperatures.

See FURNACES for other heat treatment models.


OV-160

OVENS

OV-160
Ovens, BS, fan convection, 250°C, to BS 2648, available in three sizes.

OV-165
Ovens, BS, as OV-160 but with double glazed window.

OV-330
Ovens, BS, Heavy duty, fan convection, 300°C, to BS 2648, available in two sizes.

See OVENS for details of other models.

IH-270

INCUBATORS

IH-270
Cooled Incubator for a wide range of biological testing from 0° to 45°C.

IH-280
Interior illuminated Incubator for photosynthesis and diurnal cycling studies.

IH-290
CO_2 Incubator for buffered medium cell growth and improved bacterial growth.

See INCUBATORS for details of other models.

For full details of all apparatus see entries in List No. sequence.

Gallenkamp THIN FILM EVAPORATOR

For rapid removal of solvents from solutions under vacuum using gentle heating. The apparatus is invaluable for handling temperature sensitive materials as distillation can be effected at temperatures below normal boiling points.

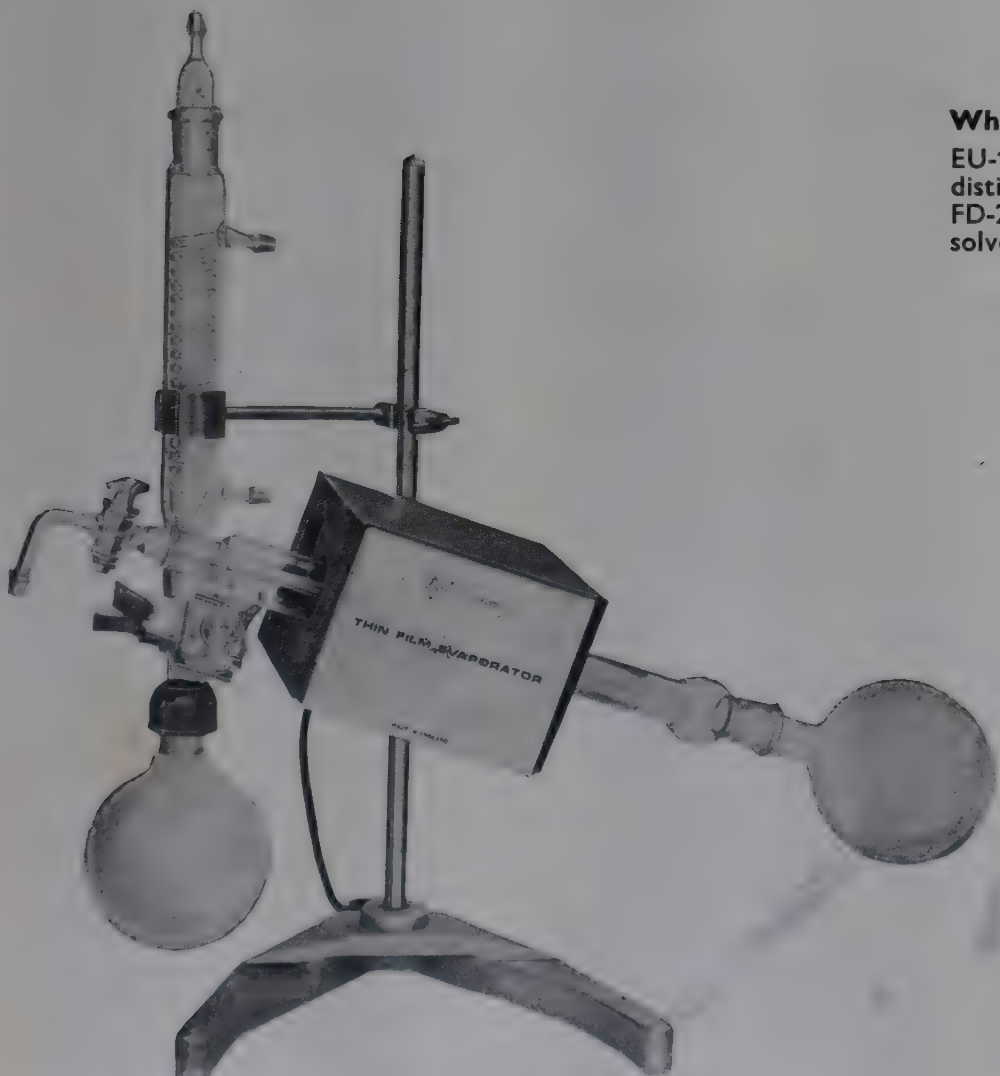
Applications include:

Pharmacology	**Nutritional studies**
Explosives chemistry	**Biochemistry**
Preparative organic chemistry	

PERFORMANCE

The rotation of the evaporator flask causes a thin film of solution to be spread over its inner wall, thus presenting a large surface area for rapid evaporation.

The apparatus is usually used in conjunction with a water bath. It is suitable both for 'batch' evaporation and for semi-continuous evaporation using the sample inlet tube which is fitted with a stopcock to enable the flask to be replenished periodically or continuously. Distillates can either be condensed and collected or run to waste, as required. High evaporation rates can be achieved; typically at 40°C and 25 torr pressure the apparatus can distil 190 ml water per hour.



EU-100 with accessories

CONSTRUCTION

The basis of the evaporator is a rotating glass seal comprising a stationary member with a parallel ground barrel and a rotating member with a ground sleeve. The seal is lubricated with silicone oil, and the evaporator flask which is connected to the rotating member is fitted with an extended cone neck to prevent the ingress of this oil.

The stationary glass member is fitted with a 19/26 socket to which the inlet tube is connected and a sidearm with S29 spherical joint. A vacuum tube adapter or a condenser adapter may be connected to the sidearm. The condenser adapter is used together with a distillate receiver and condenser when collection of distillate is required. Two condensers listed under accessories provide a choice of price and efficiency.

The glassware assembly is mounted on a stand by means of an enamel finished steel housing which is well ventilated and which encloses the drive motor and mechanism. A novel form of drive is employed, which is quiet running and has a long, maintenance-free life.

DIMENSIONS

Overall length	600 mm
Height of stand	660 mm
Weight, net, with stand	6 kg

EU-100

THIN FILM EVAPORATOR, *Gallenkamp*, as specification with evaporator drive mechanism and glass sleeve unit, mounting stand, 500 ml evaporator flask, inlet tube with stopcock, vacuum tube adapter with spherical joint and bottle of silicone lubricant.

For 200/250V 50 Hz single phase supplies.	Each	**£38·00**	*b*
For 110/120V 60 Hz single phase supplies.	Each	**£38·50**	*b*

When ordering please state voltage and frequency of supply.

EU-100 Thin film evaporator is suitable for evaporations in which the distillate is run to waste. A pump of the water-jet type (such as FD-215) is the most suitable source of vacuum. For reclamation of solvents see note under Accessories.

REPLACEMENT PARTS

EU-112	**Glass seal assembly** comprising male and female components		Each	**£6·00**	*e*
EU-114	**Evaporator flasks** with 24/29 cone necks.				
	Capacity	250	500	1000 ml	
	Each	£1·20	1·45	1·75	*e*
EU-116	**Vacuum adapter** with S29 spherical socket and nozzle for 6·5 mm bore vacuum tubing ...		Each	£1·40	*e*
EU-120	**Inlet tube** with stopcock		Each	£2·00	*e*
EU-124	**Silicone lubricant,** in plastics dispensing bottle containing approx. 25 ml		Each	£0·25	*b*
***EU-126**	**Joint clip** for 24/29 interchangeable glass joints.		Each	£0·25	*b*
JR-260	**Joint clip** for S29 spherical interchangeable glass joints. For price and details see entry in List No. sequence.				

ACCESSORIES

For reclamation of solvent, one each of the following accessories is necessary in addition to EU-100 although the condenser and flask selected will depend upon the particular application.

EU-130	**Condenser adapter** with S29 spherical socket, 24/29 socket and 24/29 cone			Each **£2·50**	*e*
Q-C3/13	**Condenser** with 24/29 socket and cone, effective area approx. 230 cm^2 ...				
Q-CX6/33	**Condenser** with 24/29 socket and cone, effective area approx. 430 cm^2 ...				
QMF10/3	**Vacuum adapter** with 24/29 cone and nozzle for 6·5 mm bore vacuum tubing ..				
	Flasks for collection of distillate. With 24/29 sockets				
	List No. QFR	250/3S	500/3S	IL/3S	
	Capacity	250	500	1000ml	
SM-670	**Clamp,** for condenser, 35 mm				
SM-635	**Bosshead** for SM-670				
SM-560	**Hexagonal wrench** for SM-635 ...				
SM-350	**Labjack,** to support receiver flask ...				

For details and prices see entries in List No. sequence.

For a suitable water bath see WF-360 in List No. sequence.
For suitable vacuum pumps see FD-215 and VB-042 et seq. in List No. sequence.

All items on this page normally available from stock.

Gallenkamp WATER BATH FOR SOXHLET EXTRACTIONS

EV-100

WATER BATH, Soxhlet, *Gallenkamp*, **stainless steel,** to take six flasks up to 500 ml capacity. This bath, overall dimensions 18 × 85 × 16·5 cm high, has a sectional top cover for easy access to the flasks. The welded steel base supports two duralumin rods, extending 60 cm (24 in) above the bath top, carrying an adjustable horizontal rod. The flasks are supported by a shelf covering the 1 kW tubular immersion element which extends practically the whole length of the bath for uniform heating. The control compartment houses an energy regulator for temperature control. With built-in constant level device and mains cable but **without glassware, condenser clamps and bossheads.**

For 220/240V a.c. single phase supplies...	Each	**£63·00**	*bS*
For 200/210V a.c. single phase supplies...	Each	**£63·50**	*b*
For 110/120V a.c. single phase supplies...	Each	**£63·50**	*b*

REPLACEMENT PART

EV-102	**Immersion element, 1 kW, single loop.**	Each	**£4·50**	*bS*

ACCESSORIES

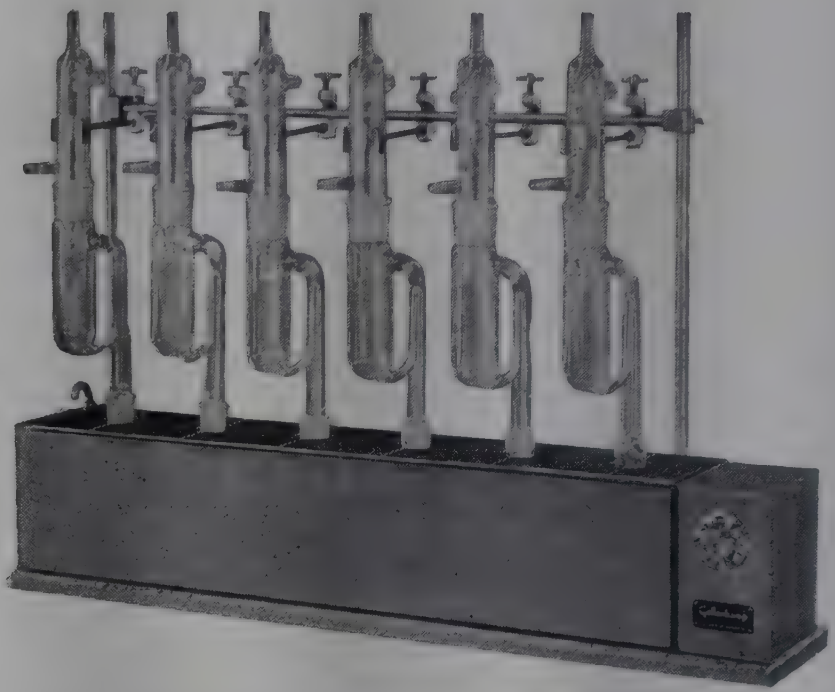
SM-670 **Spring clamps, for condensers.**

Dia.	35	40 mm
For condenser	CU-520 CU-530 joint 40/38	CU-530 joint 50/42

SM-635 **Bosshead, to mount spring clamp on horizontal rod of EV-100.**

For details and prices see entries in List No. sequence.

When ordering please state voltage and frequency of supply.



EV-100 with six extraction apparatus EV-285 and clamps

AIR BATHS FOR SOXHLET EXTRACTIONS

Designed for flasks of 100/150 and 200/350 ml capacity. Heated by coiled-coil nickel-chromium elements supported by knitted glass fabric very close to the flasks. Heat losses are minimised by glass wool insulation. Temperature is accurately controlled by built-in energy regulators, one for each flask position.

Overall width 25 cm; length of 3-position baths 66 cm, length of 6-position baths 117 cm.

For 200/250 or 100/130V single phase a.c. supplies.

AIR BATHS, *Electrothermal.*

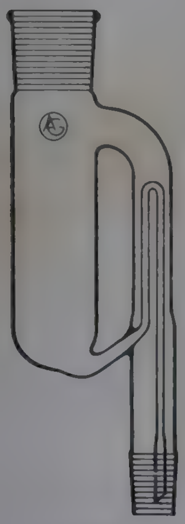
List No.	Ref. No.	Flasks No. × ml	Watts at 250V	Each £	
EV-146	ME437	3 × 200/350	450	**50·90**	*m*
EV-152	ME466	6 × 100/150	600	**79·80**	*m*
EV-154	ME467	6 × 200/350	900	**84·40**	*mS*

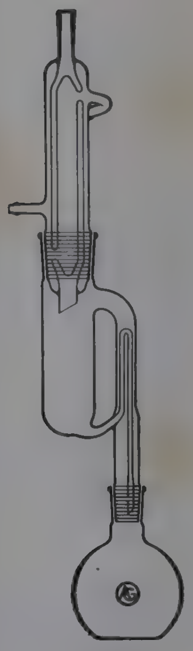
When ordering please state voltage and frequency of supply.

EV-152 and EV-154

Items on this page coded S normally available from stock.

SOXHLET EXTRACTORS


EV-280


EV-285

EV-280

EXTRACTORS, Soxhlet type Ⓐ improved pattern. Regd. Design No. 911418. A compact extractor in which the siphon tube is protected by being enclosed within the vapour tube. Reduces breakage and permits very high boiling rates due to large diameter of vapour tube. The siphon operates reliably with water or organic solvents at all normal rates of extraction.

Cone	24/29	24/29	29/32	
Socket	29/32	40/38	50/42	
Extractor capacity	40	100	200 ml	
To take thimble size	22×80	30×100	41×123 mm	
Ten	**£18·50**	**21·00**	**27·50**	*a*
Each	**£ 2·05**	**2·35**	**3·10**	

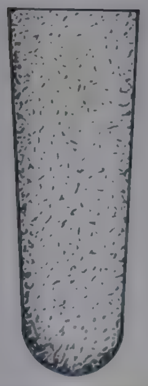
EV-285

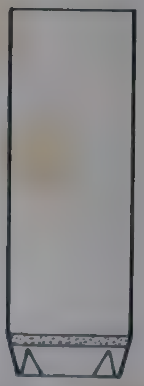
EXTRACTION APPARATUS, Soxhlet, Ⓐ. Each assembly comprises extractor EV-280 with flask FJ-110 and Davies double surface condenser. On the two larger sizes the cone joint of the condenser forms the lower end of the water jacket, making a compact and convenient extraction combination.

Extractor	40	100	200 ml	
Flask capacity	150	250	500 ml	
Flask socket	24/29	24/29	29/32	
Condenser cone	29/32	40/38	50/42	
Condenser List No.	CU-520	CU-530	CU-530	
Condenser jacket length	15	20	20 cm	
6 sets	**£21·00**	**30·00**	**36·00**	*a*
Set	**£ 3·80**	**5·50**	**6·60**	

SINTAGLASS EXTRACTION THIMBLES

For full details of porosity ranges, colour coding and other useful information see data under page heading Sintered Glassware.


EV-391 to EV-413


EV-421 to EV-441

EXTRACTION THIMBLES, ***SintAGlass,*** borosilicate glass. Made entirely from sintered glass. Mechanically strong, having a wall thickness of 2 to 3 mm, and can be handled when wet. For most purposes they can be used instead of paper thimbles, the initial cost being offset by repeated use.

Nominal size	22×80	30×100	41×123 mm	
Suitable for extractors:				
EV-280/285 size	40	100	200 ml	
Quickfit	Q-EX5/43	Q-EX5/63	Q-EX5/83	
Porosity, approx		List Numbers		
1	**EV-391**	**EV-401**	**EV-411**	
3	**EV-393**	**EV-403**	**EV-413**	
Ten	**£11·80**	**13·80**	**15·50**	*a*
Each	**£ 1·35**	**1·55**	**1·75**	

EXTRACTION THIMBLES, ***SintAGlass,*** borosilicate glass, with sintered plate fused into a glass tube. Can be heated in a furnace up to about 500°C and dried to constant weight in an oven.

Nominal size	22×80	30×100	41×123 mm	
Plate diameter	20	30	40 mm	
Height above plate	75	95	110 mm	
Suitable for extractors:				
EV-280/285 size	40	100	200 ml	
Porosity		List Numbers		
1	**EV-421**	**EV-431**	**EV-441**	
2	**EV-422**	**EV-432**	—	
3	—	**EV-433**	—	
Ten	**£4·40**	**4·90**	**6·20**	*a*
Each	**£0·49**	**0·55**	**0·70**	

For details of ignition and drying procedure see page 156.

All items on this page normally available from stock.

EV-450

EXTRACTION THIMBLES, *Whatman,* fat-free, seamless. Single thickness. In boxes of 25.

EV-452

EXTRACTION THIMBLES, *Whatman,* as EV-450 but double thickness.

List No.	**EV-450**	**EV-452**		**EV-450**	**EV-452**	
Size mm	Box of 25		Size mm	Box of 25		
	£	£		£	£	
10×50	0·69	—	28×120	1·15	—	*d*
19×90	0·83	—	30×100	1·10	1·80	*d*
22×80	0·83	1·35	33× 80	1·10	1·80	*d*
25×80	0·83	—	33× 94	1·15	—	*d*
25×100	0·90	1·50	33×118	1·50	—	*d*
26×60	0·90	—	41×123	1·80	—	*d*

Other sizes in single or double thickness to order.

EV-570

EXTRACTION FLASK, conical, *Pyrex brand* glass. Suitable for rubber analysis to ASTM D297 when used with accessories listed below. Capacity 400 ml.

Std. pack of 6 **£1·55** Each **£0·32** *d*

ACCESSORIES

***EV-575**	**Condenser,** tin spiral, to fit neck of flasks EV-570.	Each **£5·10**	*m*
EV-580	**Siphon cup,** borosilicate glass, with two suspension holes. Approximately 28 mm int. dia. and 65 mm long.	Each **£0·40**	*a*

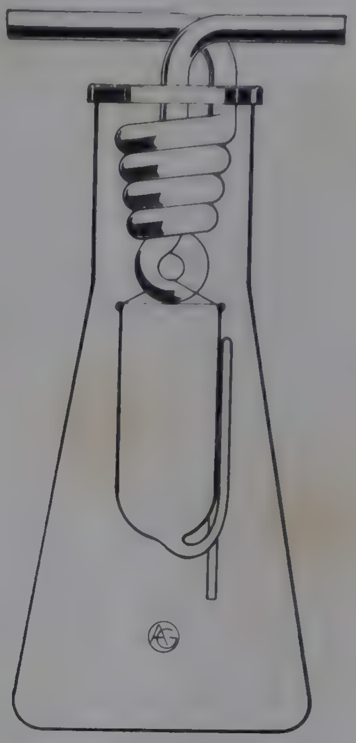
Suitable **extraction thimbles** see EV-450 and EV-452.

EXTRACTION APPARATUS, for the determination of the acetone extract value of solid unvulcanised natural rubber, to BS 903 and BS 1673 Part 2. The joint sizes of components shown in the specifications are not mandatory so several alternative assemblies are possible from *Quickfit* components. The following assemblies are the simplest and most economical to meet the requirements.

Extractor cup capacity	20	50 ml
Condenser	Q-CX 3/05	Q-CX 3/07
Extractor body	Q-EX 7/13	Q-EX 7/23
Extractor cup	Q-EX 7/10	Q-EX 7/20
Flask	Q-FF 150/3S	Q-FF 250/3S

For prices and details of above components see entries under QUICKFIT APPARATUS.

Quickfit **extraction apparatus,** see **QUICKFIT APPARATUS**



EV-570 with EV-575 and EV-580

Asphaltenes precipitation by **extraction** to IP 143—see PF-140 in List No. sequence.

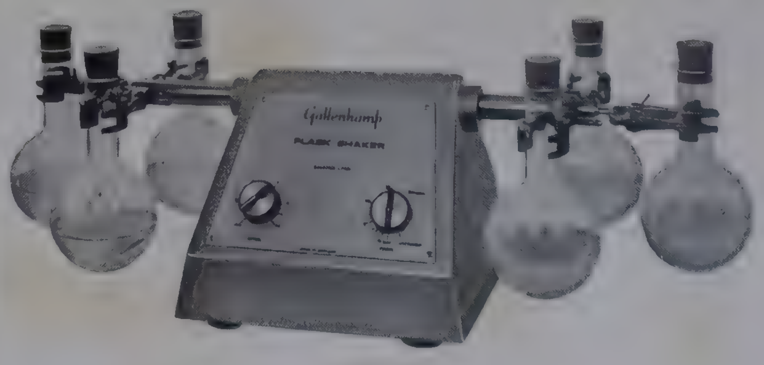
Sediment in crude and fuel oils by **extraction** to ASTM D473—IP53—see PF-960 to PF-965 in List No. sequence.

Gallenkamp
REGD TRADE MARK

FLASK SHAKER

suitable for extraction and many other applications.

- **For up to six 500 ml flasks**



SD-110

For full details and price see SD-110 in List No. sequence.

All items on this page normally available from stock.

WHATMAN FILTER PAPERS

EXPLANATION OF GRADES

Qualitative grades, Nos. GP, 1, 2, 3, 4 and 6. For filtration purposes where a low ash content is not required.

GP is a schools grade paper in circles up to 18·5 cm.

No. 1 is the most widely used for all general laboratory filtrations and qualitative analysis.

No. 6 is a smooth high retention paper.

Folded papers, Nos. 2V and 15.

No. 2V is a No. 2 grade paper folded ready for use.

No. 15 is a special purpose paper for agar-agar filtration.

Low ash grades, Nos. 30, 31 and 32. These papers are suitable for gravimetric analysis, where the lowest ash content is not necessary.

No. 30 is the standard paper for rough quantitative work.

Ashless grades, Nos. 40, 41, 42 and 44. These papers are for use in accurate gravimetric analysis.

No. 40, with medium retention and filtration speed, is the general purpose paper for gravimetric work.

Hardened grades, Nos. 50, 52 and 54. These papers have great wet strength and resistance to acid and alkali solutions, but do not contain any synthetic wet-strengthening resins. The hard smooth surface allows the removal of fine precipitates from the paper, particularly after suction filtration, by scraping or vigorous washing.

No. 50 is a very smooth surfaced paper which may be used when the removal of slimy biological suspensions from the paper after filtration is necessary.

No. 52, with medium retention and filtration speed, is the general purpose hardened grade.

No. 54 is an open-textured filter paper which may be used in filter presses as a pre-filter to remove coarse particles prior to filtration through a sterilising mat, or as an after-filter to prevent fibres from the sterilising mat passing into the filtrate.

Hardened, ashless grades, Nos. 540, 541 and 542. These papers, with very low ash content, correspond to the standard ashless grades, but the hardening process makes them particularly useful for gravimetric analysis in which strong acid or alkaline solutions are used.

High wet-strength grade, No. 90. This paper contains a small amount of a stable additive to impart a high wet strength, unlike the hardened grades which are chemically treated and contain no binders. The presence of additive is rarely significant except when accurate determination of nitrogen is involved.

Specialities include ashless tablets, ashless floc, phase separating paper and several grades of glass fibre filter papers.

WEIGHTS OF PAPER AND ASH

Grade No.	Weight g/100 cm²	Ash (average)	
		%	mg/100 cm²
1	0·87	0·06	0·52
2	0·97	0·06	0·58
3	1·85	0·05	0·92
4	0·92	0·06	0·55
6	1·00	0·06	0·60
30	0·95	0·025	0·24
31	0·91	0·025	0·23
32	1·00	0·025	0·25
40	0·95	0·01	0·09
41	0·91	0·01	0·09
42	1·00	0·01	0·10
44	0.80	0·01	0·08
50	1·00	0·025	0·25
52	1·00	0·025	0·25
54	0·93	0·025	0·23
90	1·00	0·06	0·60
540	0·88	0·008	0·07
541	0·82	0·008	0·06
542	1·00	0·008	0·08

RELATIVE FILTRATION RATES, RETENTIVITY AND PORE SIZES

Classification	Fast			Fast-Medium	Medium	Slow	
Retaining properties	Coarse particles			Medium particles		Fine particles	
Mean pore size, microns	5·0 to 3·4			2·8 to 2·1	2·9 to 1·4	1·1 to 0·4	
Relative filtration times	4–5	6–8	9–12	20–30	35–50	100–130	140–160
Qualitative grades		4		1	2, 3		6
Qualitative wet strength grade	90						
Low ash grades			31		30	32	
Ashless grades			41		40	44	42
Hardened grades		54			52		50
Hardened ashless grades		541			540		542

WHATMAN FILTER PAPERS

PACKAGING

All filter papers sizes 4·25 to 50·0 cm listed below are packed in boxes of 100 circles. The 46×57 cm sheets are in packs of 100.

List No.		FC-200	FC-205	FC-207	FC-210	FC-220	FC-230	FC-240	FC-245	FC-250	FC-255	
Circle dia. cm	Grade	1	2	2V	3	4	6	30	31	32	40	
	Qty.	£	£	£	£	£	£	£	£	£	£	
4·25	10 boxes	0·46	—	—	—	—	—	—	—	—	—	d
	Box	0·13	—	—	—	—	—	—	—	—	—	
5·5	10 boxes	0·59	—	—	—	—	—	—	—	—	—	d
	Box	0·13	—	—	—	—	—	—	—	—	—	
7·0	10 boxes	0·66	—	—	—	0·86	—	—	—	—	2·40	d
	Box	0·14	—	—	—	0·16	—	—	—	—	0·30	
9·0	10 boxes	0·88	1·10	—	2·10	1·16	1·10	2·15	2·15	2·15	3·40	d
	Box	0·16	0·18	—	0·27	0·19	0·18	0·28	0·28	0·28	0·40	
11·0	10 boxes	1·10	1·45	—	2·65	1·60	1·60	2·85	2·85	2·85	4·20	d
	Box	0·18	0·21	—	0·33	0·23	0·23	0·35	0·35	0·35	0·47	
12·5	10 boxes	1·35	1·85	4·50	3·10	2·10	2·00	3·40	3·40	3·40	5·00	d
	Box	0·20	0·25	0·50	0·37	0·27	0·26	0·40	0·40	0·40	0·56	
15·0	10 boxes	1·85	2·45	4·80	4·50	2·65	2·65	4·80	4·80	4·80	6·40	d
	Box	0·25	0·31	0·53	0·50	0·33	0·33	0·53	0·53	0·53	0·66	
18·5	10 boxes	2·80	3·50	6·40	6·60	3·80	3·80	7·20	7·20	7·20	8·60	d
	Box	0·34	0·41	0·72	0·74	0·44	0·44	0·80	0·80	0·80	0·96	
24·0	Box	0·48	0·63	0·97	1·13	0·69	0·67	—	—	—	1·45	d
32·0	Box	0·90	1·13	1·57	2·03	1·27	1·27	—	—	—	—	d
40·0	Box	1·40	1·70	2·21	—	—	—	—	—	—	—	d
50·0	Box	2·10	2·60	3·16	—	—	—	—	—	—	—	d
Sheets 46×57	5 packs	8·15	—	—	—	—	—	—	—	—	—	d
	Pack	1·75	2·50	—	3·95	3·10	3·10	—	—	—	—	

For *Whatman* G.P. grade—see FC-500.

For *Whatman* No. 1 grade semi-micro circles—see FC-504.

List No.		FC-260	FC-265	FC-275	FC-280	FC-290	FC-295	FC-296	FC-300	FC-305	FC-310	
Circle dia. cm	Grade	41	42	44	50	52	54	90	540	541	542	
	Qty.	£	£	£	£	£	£	£	£	£	£	
7·0	10 boxes	2·40	2·40	2·40	2·10	2·10	2·10	—	2·40	2·40	2·40	d
	Box	0·30	0·30	0·30	0·27	0·27	0·27	—	0·30	0·30	0·30	
9·0	10 boxes	3·40	3·40	3·40	2·90	2·90	2·90	—	3·40	3·40	3·40	d
	Box	0·40	0·40	0·40	0·35	0·35	0·35	—	0·40	0·40	0·40	
11·0	10 boxes	4·20	4·20	4·20	3·70	3·70	3·70	—	4·20	4·20	4·20	d
	Box	0·47	0·47	0·47	0·43	0·43	0·43	—	0·47	0·47	0·47	
12·5	10 boxes	5·00	5·00	5·00	4·40	4·40	4·40	2·60	5·00	5·00	5·00	d
	Box	0·56	0·56	0·56	0·49	0·49	0·49	0·32	0·56	0·56	0·56	
15·0	10 boxes	6·40	6·40	6·40	5·60	5·60	5·60	3·50	6·40	6·40	6·40	d
	Box	0·66	0·66	0·66	0·62	0·62	0·62	0·41	0·66	0·66	0·66	
18·5	10 boxes	8·60	8·60	8·60	8·00	8·00	8·00	5·20	8·60	8·60	8·60	d
	Box	0·96	0·96	0·96	0·90	0·90	0·90	0·58	0·96	0·96	0·96	
24·0	Box	1·45	1·45	—	—	—	—	—	1·45	1·45	1·45	d

For *Whatman* specialities see overleaf.

For *Green's* and *Technico* papers see page 241.

All items on this page normally available from stock.

WHATMAN PAPERS *(Contd.)*

FC-500

FILTER PAPERS, *Whatman,* **G.P.** Schools grade, in cartons of 1000 circles.

Dia.	9	11	12·5	15	18·5 cm	
Carton	**£0·58**	**0·72**	**0·84**	**1·08**	**1·52**	*d*

FC-504

FILTER PAPERS, *Whatman,* **No. 1 semi-micro** circles. In boxes of 400 circles.

Dia.	2·1	2·5 cm	
10 boxes	**£1·25**	**1·30**	*d*
Box	**£0·19**	**0·20**	

FC-515

FILTER PAPERS, FOLDED *Whatman,* **No. 15.** For agar-agar filtration. In box of 50 squares each 32 × 32 cm, ready folded ... ... Box **£1·03** *d*

FC-520

PHASE SEPARATING PAPER, *Whatman,* **No. 1PS,** for separating aqueous solutions from water immiscible solvents. Used folded in a conical funnel, the paper retains the aqueous phase. Unsuitable for vacuum filtration or where the surface tension of the aqueous phase is reduced by alcohols or wetting agents. In boxes of 100 circles.

Dia.	7	9	11	12·5	15	18·5 cm	
Box	**£0·29**	**0·41**	**0·63**	**0·83**	**1·12**	**1·58**	*d*

WHATMAN SPECIALITIES

FC-530

ASHLESS TABLETS, *Whatman.* Made from ashless material, each tablet 3·85 cm dia., with approximate weight 2·4 g and ash content approximately 3 mg. Easily dispersed in water. Used for large scale filtration of gelatinous precipitates, or where a bulk supply of filter aids is necessary for a batch of small scale precipitations. Supplied in tubes of 50 tablets.

5 tubes **£1·60** Tube **£0·37** *d*

FC-540

ASHLESS FLOC, *Whatman,* for use as a filter aid or for preparation of filter pulp beds in conical or Buchner funnels. The floc resembles dry dispersed pulp and is supplied in pack of 100 g... ... ... Pack **£0·30** *d*

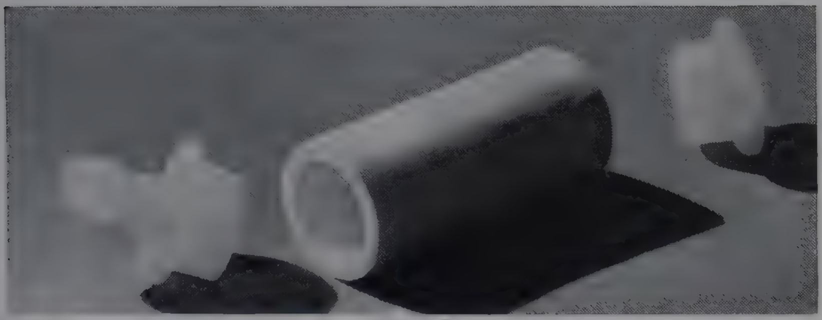
FC-570

FILTER PAPER CLIPPINGS, *Whatman,* 'Ordinary'. In pack of 500 g ... ... Pack **£0·25** *d*

FC-575

FILTER PAPER CLIPPINGS, *Whatman,* 'Ashless'. In pack of 500 g ... ... Pack **£0·63** *d*

WHATMAN GLASS FIBRE FILTERS



FC-640
FC-642

FILTER TUBES

For filtration and clarification of bulk quantities of liquids in bottles or carboys. Made of resin reinforced glass fibres resistant to most laboratory reagents up to 160°C. Provide 98% retention of 2μm particles. Supplied in packs containing ten tubes complete with one each polypropylene end cap and tubing connector.

List No.		**FC-640**	**FC-642**	
Size No.		A1	B2	
Diameter, external	mm	15	25	
internal	mm	12	19	
Length	mm	60	60	
Flow rate, water with 150 torr suction,	litres/min	>0·7	>1·4	
Average capacity solids before clogging,	mg	50	200	
Pack		**£1·15**	**£2·00**	*d*

FILTER CIRCLES

These circles, made of fine borosilicate glass fibres, are extremely retentive, have great wet strength and are much faster than most cellulose papers. As the circles contain no binder or cellulose they will withstand most laboratory reagents and can be heated to 500°C.

FC-650

FILTER CIRCLES, GLASS FIBRE, *Whatman,* **GF/A.** Made from glass fibres of 0·5 μm dia. A very fast, thin filter, about 0·2 mm thick, with very high retention properties. In box containing 100 circles.

FC-660

FILTER CIRCLES, GLASS FIBRE, *Whatman,* **GF/B.** Made from glass fibres of 0·5 μm dia. The filter is about 0·65 mm thick, and therefore not so fast as FC-650, but more retentive. In box containing 100 circles.

FC-670

FILTER CIRCLES, GLASS FIBRE, *Whatman,* **GF/C.** Made from glass fibres of less than 0·5 μm dia. An ultra-fine filter of thickness about 0·2 mm, with retention properties greater than FC-660. In box containing 100 circles.

List No.	**FC-650**		**FC-660**		**FC-670**		
Grade	GF/A		GF/B		GF/C		
Dia. cm	10 boxes	Box	10 boxes	Box	10 boxes	Box	
	£	£	£	£	£	£	
2·1	4·00	0·45	5·40	0·60	4·40	0·49	*d*
2·5	4·20	0·47	5·60	0·62	4·50	0·50	*d*
4·25	4·90	0·55	8·00	0·90	5·90	0·66	*d*
5·5	5·70	0·64	10·60	1·18	7·60	0·84	*d*
7·0	6·80	0·76	14·00	1·55	9·80	1·10	*d*
9·0	8·80	0·98	20·00	2·25	13·60	1·50	*d*
11·0	11·60	1·30	25·00	2·80	18·50	2·05	*d*
12·5	14·00	1·55	36·00	4·00	23·00	2·55	*d*

All items on this page normally available from stock.

GREEN'S FILTER PAPERS

FC-705

FILTER PAPERS, *Green's* **No. 401.** For the use of students, and other general qualitative work. In boxes of 100 circles.

Dia.	7	9	11	15	18·5	24 cm	
10 boxes	**£0·50**	**0·70**	**0·90**	**1·40**	**2·30**	**2·90**	*d*
Box	**£0·13**	**0·14**	**0·16**	**0·21**	**0·29**	**0·35**	

FC-710

FILTER PAPERS, *Green's* **No. 904.** A fast, hardened paper, resistant to acid and alkali solutions, and suitable for qualitative work. In box of 100 circles.

Dia.	9	11	15	18·5	24 cm	
Box	**£0·28**	**0·36**	**0·52**	**0·89**	**1·36**	*d*

FC-715

FILTER PAPERS, *Green's* **No. 904½, folded.** For agar-agar filtration. In box of 100 circles.

Dia.	15	18·5	24	32	50 cm	
Box	**£0·99**	**1·36**	**1·95**	**3·03**	**5·55**	*d*

FC-730

FILTER PULP, *Green's* **No. 301.** Ash content 0·6%. Supplied in sheets approx. 60×30×0·2 cm, approx. 6 sheets/lb.
Per 14 lbs **£4·20** Per 1 lb (approx.) **£0·38** *d*

Technico FILTER PAPERS

REGD. TRADE MARK

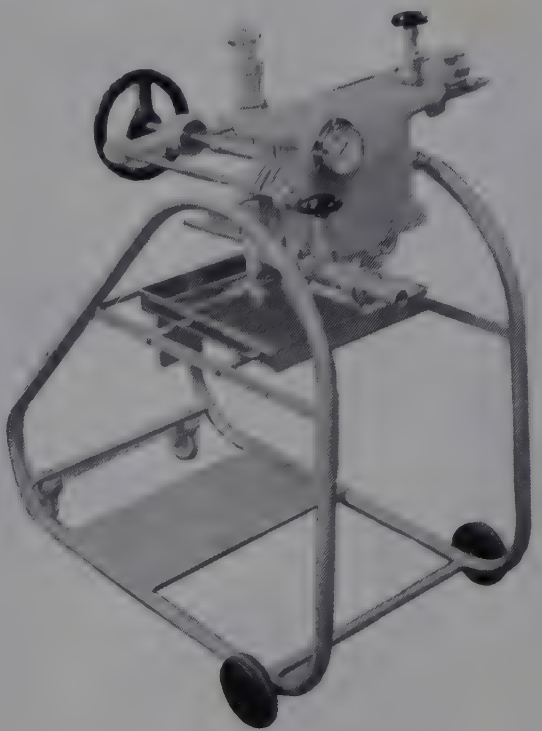
FC-770

FILTER PAPERS, *Technico.* A good reliable white paper suitable for school use, 11 cm dia. In pack of 1000 circles ... ... Pack **£0·60** *d*

FC-772

FILTER PAPERS, *Technico,* as FC-770, but supplied in sheets 60×60 cm. In pack of 500 sheets.
Pack **£6·90** *d*

FILTER PAPER CASE, see FV-245 in List No. sequence.



FD-062

FD-070

NOTE: FILTER PRESSES

Enquiries for filter presses must include information on the following:

- **Product to be filtered**
- **Liquid to be filtered**
- **Insoluble matter to be removed**
- **Size of particles: average, maximum and minimum**
- **Whether solid, liquid or both required**
- **Total volume to be filtered in one operation**

FILTER PRESS

A useful size of filter which can be fitted with up to 7 filter plates each 20×20 cm. Suitable for pressure or gravity filtration. The filter plates are of lacquered aluminium alloy and inlet and outlet connections are of silver-plated lead-free bronze.

The press may be sterilised by steam or by autoclaving.

Dimensions; 80×56×92 cm high.

FD-062

FILTER PRESS, Pilot Princess, trolley mounted, as specification. Supplied with 3 plates to accept 4 filter sheets ... ... Each **£136·10** *fN*

When ordering filter presses please state whether sterilisation is to be by steam or autoclaving.

ACCESSORIES

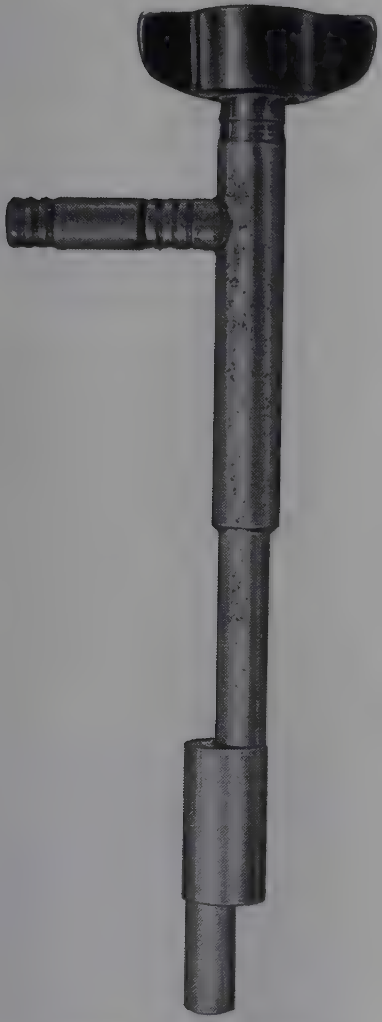
FD-068 **Filter sheets,** *Carlson-Ford* grade HP/EKS. Size 20×20 cm with holes to fit filter plates. In box of 50 sheets ... ... Box **£2·07** *f*

FD-070 **Pressure vessel,** 5 litre, with a maximum working pressure of 0·7 kgf/cm² (10 lbf/in²). The vessel, of mild steel with welded joints and malleable cast iron lid, is heavily tinned on the inside against corrosion. Fitted with pressure gauge, safety valve, vent cock and Schrader valve for pressurising, with outlet cock and nozzle at the base ... ... Each **£79·00** *m*

Items on this page normally available from stock except those coded *N*.

Gallenkamp METAL FILTER PUMPS

FD-210



FD-215 with FD-216

FD-210

FILTER PUMP, *Gallenkamp*, of plated metal. A low price pump recommended for general filtration purposes. With a water supply at 1·75 kgf/cm^2 (25 lbf/in^2) the pump requires only 6 litres of water in approx. 100 sec to evacuate a 1 litre system to an ultimate vacuum of about 15 torr. Overall length 12 cm. With corrugated nozzle for pressure tubing connection to tap.
Ten **£9·40** Each **£1·04** *b*

FD-215

FILTER PUMP, *Gallenkamp*, **high efficiency, chromium plated.** The water passes through a polypropylene nozzle into a small cavity where an annular space between the water jet and the cavity wall forms a low pressure region. This annular space, compared with the small area of the side arm in traditional pumps, provides the pump with its greatly enhanced efficiency. The water then proceeds through a venturi and finally to the vortex cavity and off-set outlet which ensures that the venturi remains full and so eliminates the need for an immersed tail pipe. An efficient non-return valve is fitted in the vacuum connection. Using a water supply at 1·75 kgf/cm^2 (25 lbf/in^2) pressure, the pump requires only 3·5 litres of water to evacuate a 1 litre system to 15 torr, and such evacuation, owing to the high throughput rate, takes only 35 seconds. An ultimate vacuum of 12 to 15 torr is obtainable. Overall length 20 cm. For tubing connection to water tap ... ... Ten **£16·50** Each **£1·85** *b*

ACCESSORY

FD-216 **Wing nut adapter** for connection to water taps with ½ in BSP thread male outlets. Comprises chromium plated insert with black corrosion-resistant wing nut and washer ... ... Ten **£4·00** Each **£0·45** *b*

REPLACEMENT PART

FD-217 Spares kit comprising 3 neoprene inserts for non-return valve and 12 neoprene washers for wing nut adapter ... ... Each **£0·45** *b*

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Most British Standards prepared or revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓐ or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

FILTER PUMPS AND ACCESSORIES

(continued)

FD-218
FILTER PUMP, glass, with non-return valve of acid resisting rubber ... Ten **£11·00** Each **£1·25** *m*

FD-220
FILTER PUMP, *Edwards*, black plastics, with integral non-return valve ... ... Each **£1·40** *m*

FD-235
FILTER PUMP, *Edwards*, Model 7, stainless steel with combined $\frac{1}{4}$ in male BSP and tubing connector. An integral non-return valve is fitted ... Each **£3·40** *m*

FD-237
FILTER PUMP, *Edwards*, Model 8. As FD-235 but with $\frac{1}{4}$ in female BSP thread ... ... Each **£3·40** *m*

REPLACEMENT PART
FD-239 Valve inserts, viton rubber, for pumps FD-235 and FD-237 ... ... Pack of 3 **£0·75** *m*

ACCESSORY
FD-240 Vacuum gauge, with attachment for use with pumps FD-235, FD-237, scale 0–760 mm, 0–30 in Hg. Each **£3·30** *m*

VACUUM GAUGES and stands, suitable for use with filter pumps, see GAUGES.

FD-250
FILTER PUMP, electrically operated. A reciprocating diaphragm pump with polypropylene body, neoprene diaphragm and silicone rubber valve, driven by a totally enclosed motor with integral fan cooling and on anti-vibration mountings. The whole is enclosed in a louvred metal case with inlet and exhaust tubulures for 8 mm bore flexible tubing and mains connecting cable. Vacuum 150 torr. Pressure 1·4 kgf/cm^2. Provides adequate suction for most laboratory filtration purposes with the advantage that the pump is made of relatively chemical resistant materials. For 230/250V a.c. supplies only. Each **£25·00** *m*

REPLACEMENT PART
FD-252 Replacement parts kit comprising cover gasket, ten inlet filters, ten valve washers, diaphragm and clamp ring ... ... Kit **£1·00** *m*

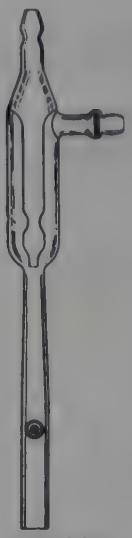
***FD-255**
NON-RETURN VALVE, polypropylene, for use with filter pumps ... Ten **£2·50** Each **£0·31** *m*

***FD-260**
AIR INLET VALVE, for vacuum systems, plastics, with corrugated ends for tubing connection. Ten **£4·00** Each **£0·45** c

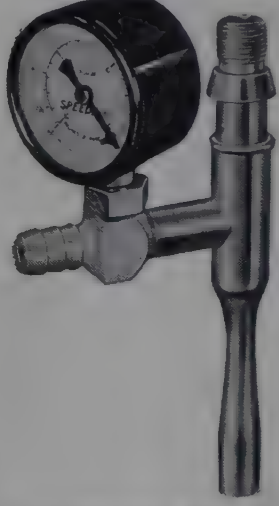
FILTER PUMP TUBING SIZES

Rubber tubing List Nos. TX-520 et seq. is listed under BS 2775 size designations. The table below indicates which of these sizes are suitable for the vacuum and water outlet connections of the filter pumps and accessories listed above. The water inlet connection should preferably be of canvas reinforced tubing TX-625 or terylene reinforced PVC tubing TX-778.

List No.	Vacuum	Water	
		Inlet mm	Outlet
FD-210	Size H8	9·5	Size N8
FD-215	,, ,,	9·5	—
FD-218	,, ,,	9·5	,, N10
FD-220	,, ,,	12·5	,, N10
FD-235	,, ,,	12·5	,, N10
FD-237	,, ,,	—	,, N10
FD-250	,, ,,	—	—
FD-255	,, ,,	—	—
FD-260	,, ,,	—	—


FD-218

FD-220


FD-235 with FD-240

FD-250

FD-255

FD-260

All items on this page normally available from stock.

Gallenkamp FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION

USING FILTER MEMBRANES

Widely used to filter liquids for the separation or examination and analysis of particulate and biological matter.

Typical fields of application include:

- **Water, sewage and marine biology.**
- **Dairy products.**
- **Sugar and allied foodstuffs.**
- **Bacteriology, virology and mycology.**
- **Antibiotics and disinfectants.**
- **Beers, wines and soft drinks.**
- **Clinical fluids including blood, urine, spinal fluids and gastric and pleural washings.**

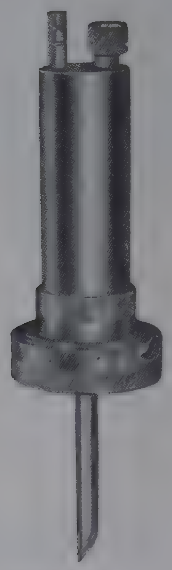
The filters are also used as one stage in the ultracleaning and sterilising of liquids.

In a typical bacteriological test, the filter holder is sterilised by autoclaving and the membranes are sterilised by immersing in boiling water. For each sample a fresh membrane is inserted into the holder (observing aseptic precautions such as the use of sterile forceps) and the sample is rapidly filtered by the application of suction or pressure. The membrane may then, if required, be transferred to a Petri dish containing nutrient, and incubated.

NOTE: Oxoid filter membranes, metal culture dishes, nutrient pads and prepared media are obtainable from Oxoid Ltd., Southwark Bridge Road, London, S.E.1.

FD-350

FD-356



FD-358

METAL FILTER HOLDERS

The cylindrical funnel top is stainless steel, the conical top is anodised aluminium, the positive pressure top and all other metal parts are heavily tin nickel plated.

These filter holders are designed for ease and speed of operation. They have a quick sealing ring which engages with the base by a two-start thread. The membrane is clamped between the top part and base, and rests on a sintered glass filter bed using silicone rubber gaskets to effect a seal. Sintered bronze filter beds are also available. The gaskets may be sterilised by autoclaving at 121°C (1·05 kgf/cm²).

FD-350

FILTER HOLDER, *Gallenkamp*, as specification, **for gravity or vacuum filtration.** Accepts 50 mm dia. membranes. With cylindrical funnel top having capacity marks at 50 and 100 ml. **Without membranes.**
Ten **£64·00** Each **£7·20** *b*

REPLACEMENT PARTS AND ACCESSORIES

FD-351	**Funnel top,** stainless steel	Each	**£0·95**	*b*
FD-352	**Gaskets,** silicone rubber	Pair	**£0·45**	*b*
FD-354	**Filter bed,** sintered bronze	Each	**£0·45**	*b*
FD-355	**Filter bed,** sintered glass	Each	**£0·45**	*b*

FD-356

FILTER HOLDER, *Gallenkamp*, as specification, **for gravity or vacuum filtration.** Accepts 50 mm dia. membranes. With conical funnel top, 11·5 cm dia. × 18 cm high, capacity 500 ml. The funnel is retained by a split collar which may be re-used if the funnel is replaced. **Without membranes.**
Ten **£76·00** Each **£8·40** *b*

REPLACEMENT PARTS

FD-357	**Funnel top,** without collar, anodised aluminium	Each	**£2·00**	*b*

Other parts see FD-352, FD-354 and FD-355.

FD-358

FILTER HOLDER, *Gallenkamp*, as specification, **for pressure filtration.** Accepts 50 mm dia. membranes. With positive pressure top, capacity 100 ml, fitted with a nozzle for pressure connection and a screw-on cap for filling and pressure release. **Without membranes .**
Ten **£98·00** Each **£10·80** *b*

REPLACEMENT PARTS

See FD-352, FD-354 and FD-355.

CONVERSION PARTS

FD-359	**Top vessel,** nickel-plated, converts FD-350 or FD-356 to FD-358	Each	**£3·50**	*b*
FD-361	**Funnel,** 11·5 × 18 cm fitted with clamping ring, converts FD-350 or FD-358 to FD-356	Each	**£5·00**	*b*

All items on this page normally available from stock.

Gallenkamp FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION

USING FILTER MEMBRANES

METAL FILTER HOLDER

ELFORD PATTERN

Some membrane filters require a fairly high positive pressure particularly when the pore size is very small as for the study of viruses. The Elford filter holder is designed for this application and is very heavily constructed in nickel plated brass.

The filter holder is in two parts held together by a screwed clamping ring for which a pair of 'C' spanners is available. The membrane is clamped between two silicone washers and supported by a perforated silver disk. Can also be used for vacuum filtration.

FD-370

FILTER HOLDER, Elford, *Gallenkamp*, as specification, **for pressure filtration.** Accepts 40 mm dia. membranes. **Without spanners or membranes** ... Each **£14·00** *b*

ACCESSORIES

FD-372	**Spanners,** a minimum of 1 pair required.	Pair	**£1·65**	*b*
FD-374	**Silicone rubber washers** ...	Pack of 10	**£1·30**	*b*

ALL-GLASS FILTER HOLDERS

These filter holders are made from borosilicate glass and are easily cleaned and sterilised.

The filter body is available with either 24/29 or 29/32 standard cone joint, with drip end to deliver below the level of the side tube of any Buchner flask with which it may be used.

The selected membrane is supported on a flat ground sintered glass disk. For security and freedom from leakage, the membrane is clamped around its periphery by means of a three screw ring clamp. The clamp is so designed that the two halves of the holder are easily assembled and separated.

FD-390

FILTER HOLDER, (AG), as specification, **all-glass, for gravity or vacuum filtration.** Accepts 47 or 50 mm dia. membranes. Comprises funnel top 8·5 cm dia., capacity approx. 300 ml, ring clamp and filter body with sintered glass disk porosity 2 and 24/29 drip ended ground cone. **Without membranes** ... ... Each **£11·00** *b*

FD-392

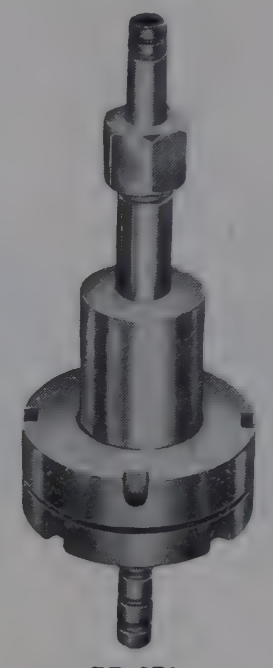
FILTER HOLDER, as FD-390 but with 29/32 cone. Each **£11·00** *b*

FD-394

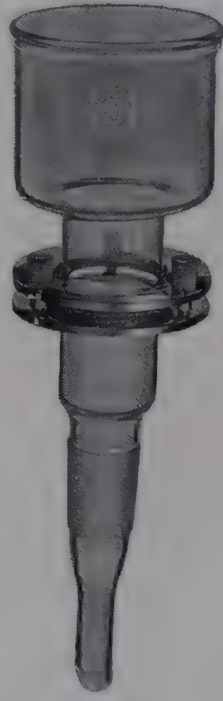
FILTER HOLDER, (AG), as specification, **all-glass, for pressure filtration.** Accepts 47 or 50 mm dia. membranes. Comprises heavy wall pressure top 8 cm dia., capacity approx. 300 ml, pressure connection nozzle, filtrant inlet tube, flow control stopcock, ring clamp and filter body with sintered glass disk porosity 2 and 24/29 drip ended ground cone. All nozzles accept 8 mm bore flexible tubing. **Without membranes.** Each **£14·75** *b*

FD-396

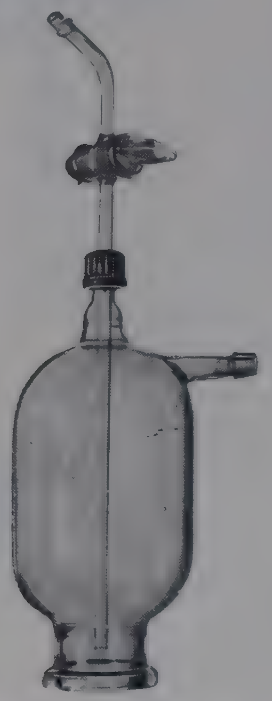
FILTER HOLDER, as FD-394 but with 29/32 cone. Each **£14·75** *b*



FD-370



FD-390



FD-402 with FD-403

REPLACEMENT PARTS

FD-400	**Funnel top,** borosilicate glass	Each	**£2·45**	*a*
FD-402	**Pressure top,** borosilicate glass with SQ13 screw joint but without inlet tube	Each	**£4·90**	*a*
FD-403	**Inlet tube** to fit screw joint of FD-402.	Each	**£1·25**	*a*
FD-404	**Filter body** with sintered plate and 24/29 cone joint.	Each	**£6·10**	*a*
FD-406	**Filter body** with sintered plate and 29/32 cone joint.	Each	**£6·10**	*a*

Q-QC13/7	**Screw cap**	For details and prices see QUICKFIT APPARATUS.
Q-QR13/6	**Rubber ring**	
Q-QW13/6	**Ptfe washer**	

ACCESSORIES

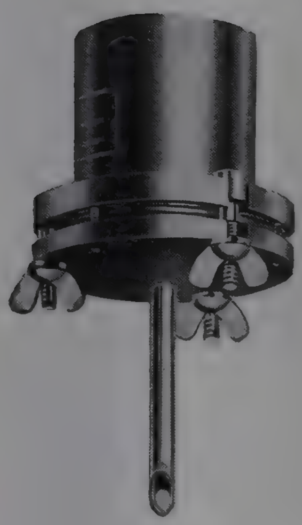
FD-215	**Filter pump**	For details and prices see entries in List No sequence.
FJ-290	**Filter flasks** with 29/32 socket and sidearm	

All items on this page normally available from stock.

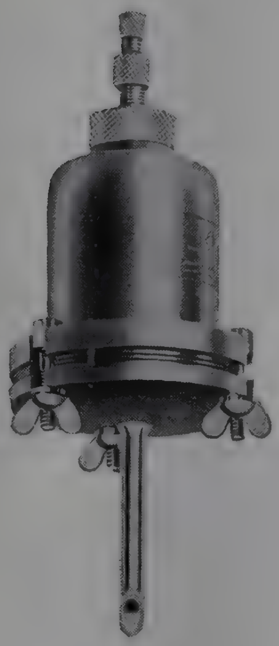
FILTER HOLDERS

FOR CLARIFICATION AND STERILISATION

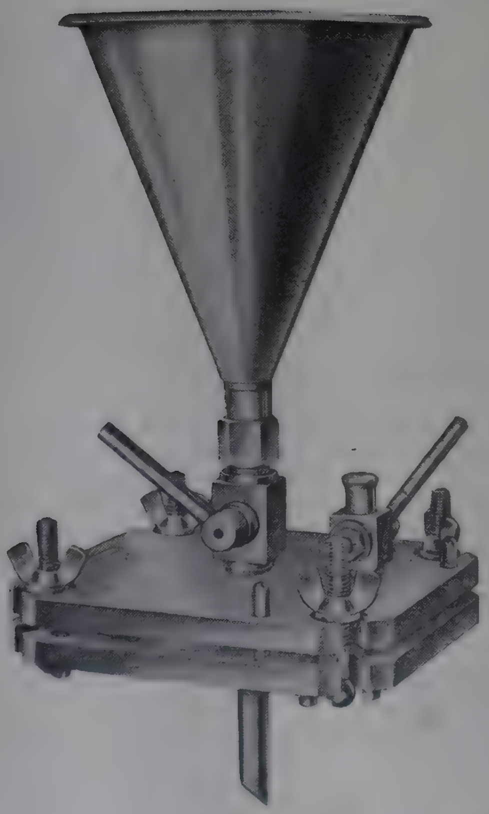
USING CARLSON-FORD FILTER SHEETS



FD-421
FD-426



FD-431



FD-436

METAL FILTER HOLDERS

Each filter holder is **made of brass, heavily silver-plated, and fitted with a silver-plated brass gauze** to support the filter sheet. The filter sheet forms the joint between the two halves of the filter and is pulled directly into position under an even pressure, thus ensuring a perfect seal.

FD-421

FILTER HOLDER, as specification, **for vacuum filtration.** Accepts 3·6 cm dia. filter sheets. With cylindrical funnel top, capacity 25 ml ... ... Each **£5·15** *f*

FD-426

FILTER HOLDER, as specification, **for vacuum filtration.** Accepts 6 cm dia. filter sheets. With cylindrical funnel top, capacity 80 ml ... ... Each **£7·80** *f*

FD-431

FILTER HOLDER, as specification, **for vacuum or pressure filtration.** Accepts 6 cm dia. filter sheets. With cylindrical pressure top, capacity 80 ml. Each **£9·15** *f*

FD-436

FILTER HOLDER, as specification, **for vacuum or pressure filtration.** Accepts 14 cm dia. filter sheets. With centre connection to take either an inlet pipe, or funnel of about 650 ml capacity. Complete with inlet pipe and 650 ml funnel ... ... Each **£33·35** *f*

ACCESSORIES

FD-438 **Filter sheets,** *Carlson-Ford* Grade HP/EKS. In boxes of 25 circles.

Diameter	3·6	6	14 cm	
Box	**£0·20**	**0·33**	**0·86**	*m*

FD-070 **Pressure vessel,** for use with FD-436. For details and price see entry in List No. sequence.

FILTER SHEETS *Carlson-Ford* Grade HP/EKS

This is a high purity sterilising grade of asbestos filter sheets which removes deposits by absorption.

To ensure sterility, the filter holder with the sheet loosely in position should be autoclaved at 1·05 kgf/cm² steam pressure for 30 min. If steam is passed through the filter for this purpose, the static pressure **must not exceed 0·35 kgf/cm².**

The pressure difference between the inlet and the outlet side of the filter must be kept low, **and should not exceed 1·05 kgf/cm² when sterile filtration is required.**

All items on this page normally available from stock.

FILTER HOLDERS

FOR CLARIFICATION AND STERILISATION

USING CARLSON-FORD FILTER SHEETS

Gallenkamp
REGD TRADE MARK

GLASS FILTER HOLDERS

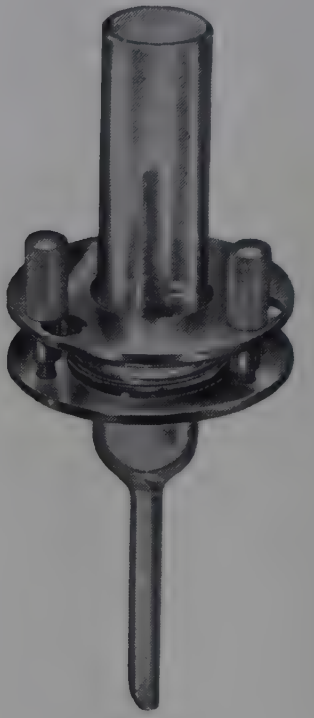
These filter holders are **made of glass with stainless steel disks.** Each is designed so that filtering liquids come in contact only with glass and a stainless steel perforated disk which supports the filter sheet. This eliminates contamination by toxic metals, which may occur with worn plated-metal filter holders. The disk, including the filtering holes, is polished to withstand corrosion, and fits in a recess in the lower part of the glass filter. The glass parts are held together by screws with milled heads, using finger-tightening to prevent breakage of the glass flanges.

FD-440

FILTER HOLDER, *Gallenkamp*, as specification, **for vacuum filtration.** Accepts 3·6 cm dia. filter sheets. With cylindrical funnel top, capacity approx. 20 ml.
Each **£4·20** *b*

REPLACEMENT PARTS

FD-442	**Glass lower part**	Each	**£0·85**	*a*
FD-444	**Glass upper part**	Each	**£0·60**	*a*
FD-438	**Filter sheets,** *Carlson-Ford*, **grade HP/EKS, 3·6 cm dia. For prices see entry in List No. sequence.**			


FD-440
FD-450

FD-450

FILTER HOLDER, *Gallenkamp*, as specification, **for vacuum filtration.** Accepts 6 cm dia. filter sheets. With cylindrical funnel top, capacity approx. 100 ml.
Each **£6·00** *b*

REPLACEMENT PARTS

FD-452	**Glass lower part**	Each	**£1·55**	*a*
FD-454	**Glass upper part**	Each	**£1·20**	*a*
FD-438	**Filter sheets,** *Carlson-Ford*, **grade HP/EKS, 6 cm dia. For prices see entry in List No. sequence.**			

HEMMINGS FILTER HOLDERS

These filter holders are **made from chromium plated brass** and are used for clarification and sterilisation of small samples of biological fluids, when rapid filtration without heavy loss of material is required. They are normally used in pairs in a centrifuge with 50 ml buckets. In use each filter holder is fitted with two 7 ml screw cap bottles CX-200, one to contain the original sample and the other to act as the receiver. The liquid is filtered by 18 mm dia. filter sheets, and the product can be stored in the receiver bottle, thus minimising the risk of contamination. The filter holders are easily cleaned and assembled. Tests have shown that 4 ml of nutrient broth can be sterilised in each filter holder in 5 minutes, using a grade EKS sheet, and a Junior centrifuge CF-405, with head CF-430, rotating at 2300 rev/min.

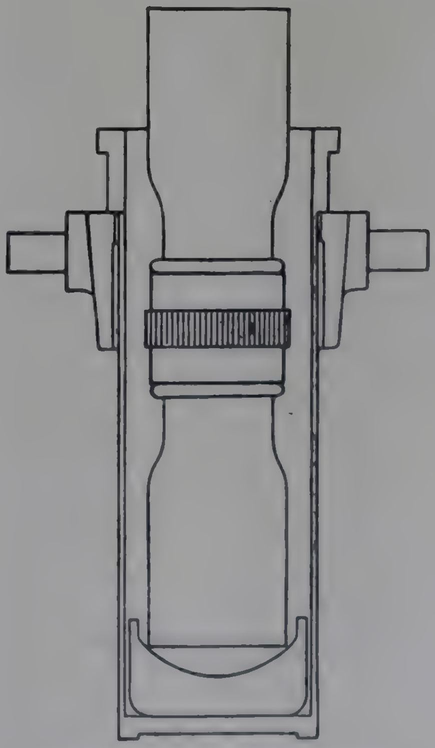
FD-480

FILTER HOLDERS, Hemmings, as specification, **for use in a 50 ml centrifuge bucket.** Accepts 18 mm dia. filter sheets. **Without 7 ml capacity screw cap bottles** ... ... Pair **£2·50** *f*

ACCESSORIES

FD-482	**Filter sheets,** *Carlson-Ford*, **grade EKS, 18 mm dia. In pack of 200 sheets. 10 packs £9·60 Pack £1·06**	*m*
CF-405	**Junior centrifuge** ...	For details and prices see entries in List No. sequence.
CF-430	**Head**	
CX-200	**Screw cap bottles** ...	

NOTE: Filters fitted with 14 ml bottles require 100 ml size centrifuge buckets as used on centrifuge CF-600 with head CF-645.


Filter assembled with 7 ml bottles CX-200 in bucket of centrifuge CF-405, with head CF-430.

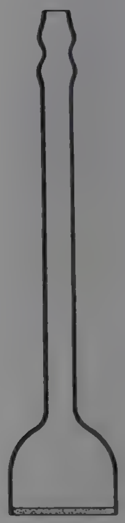
FD-480

All items on this page normally available from stock.

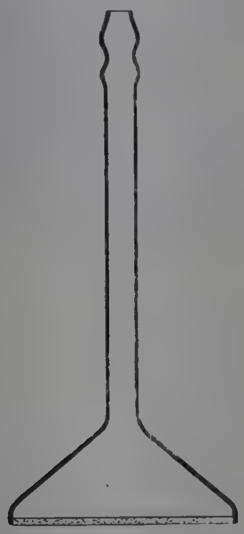
SINTAGLASS MACRO FILTERS

- Close tolerance porosity ranges
- Colour coded for porosity
- Non-friable sintered plates
- Made from borosilicate glass

For full details of porosity ranges, colour coding and other useful information see data under page heading Sintered Glassware.



FD-502
FD-503



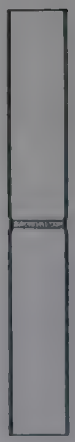
FD-512 to FD-523

IMMERSION FILTERS, *SintAglass*. For use by immersion in the liquid to be filtered after allowing the precipitate to settle.

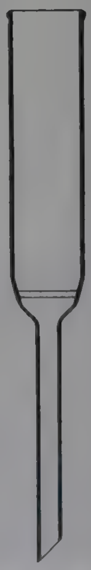
Plate diameter	30	65	90 mm	
Height above plate	110	110	125 mm	
Porosity	List Numbers			
2	FD-502	FD-512	FD-522	
3	FD-503	FD-513	FD-523	
Ten	£8·40	14·20	27·00	a
Each	£0·94	1·60	3·00	

FILTER TUBES, *SintAglass*, comprising sintered plate sealed into the centre of a tube 150 mm long. Designed for assembling into special apparatus without the troublesome job of sealing-in the plate itself, an operation requireing special equipment and skill. Will seal to borosilicate glass with an expansion coefficient of $3{\cdot}2 \times 10^{-6}$.

Plate diameter	10	20	30	40 mm	
Porosity	List Numbers				
0	FD-530	FD-540	FD-550	FD-560	
1	FD-531	FD-541	FD-551	FD-561	
2	FD-532	FD-542	FD-552	FD-562	
3	FD-533	FD-543	FD-553	FD-563	
4	FD-534	FD-544	FD-554	FD-564	
Ten	£4·00	4·20	4·90	6·40	a
Each	£0·45	0·47	0·55	0·72	



FD-530 to FD-564



FD-573 to FD-584

FILTER FUNNELS, *SintAglass*, with sintered plate. FD-582 can be used as a mercury filter for passing mercury through under its own weight.

Capacity, approx.	30	120 ml	
Plate diameter	20	30 mm	
Height above plate	100	200 mm	
Porosity	List Numbers		
1	—	FD-581	
2	—	FD-582	
3	FD-573	FD-583	
4	FD-574	FD-584	
Ten	£5·50	5·90	a
Each	£0·62	0·66	

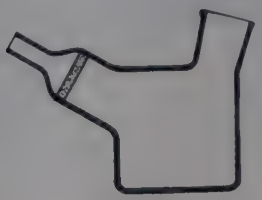
FILTERS, immersion, thimble form, see gas distribution tubes GD-841 to GD-853 in List No. sequence.

All items on this page normally available from stock.

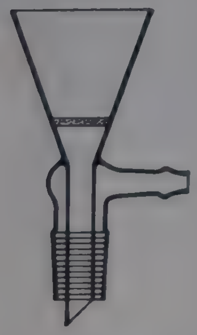
SINTAGLASS MICRO FILTERS

- **Close tolerance porosity ranges**
- **Colour coded for porosity**
- **Non-friable sintered plates**
- **Made from borosilicate glass**

For full details of porosity ranges, colour coding and other useful information see data under page heading Sintered Glassware.



FD-594



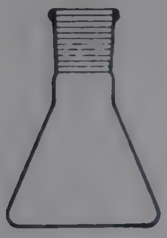
FD-603

FD-594

FILTER BEAKER, ***SintaGlass,*** 10 mm dia. porosity 4 sintered plate sealed into side spout. Capacity approx. 6 ml ... ... Ten **£13·20** Each **£1·50** *a*

FD-603

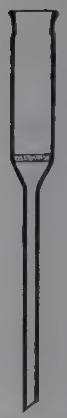
FILTER FUNNEL, ***SintaGlass,*** **micro-Hirsch,** with 10 mm dia. porosity 3 sintered plate, 35 mm dia. funnel top, 14/15 cone and vacuum connection. For use with flask FD-606 ... ... Ten **£12·00** Each **£1·35** *a*



FD-606

ACCESSORY

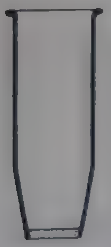
FD-606	**Flasks, conical, with 14/15 socket.**			
	Capacity	10	25 ml	
	Ten	**£3·80**	**4·10**	*a*
	Each	**£0·44**	**0·46**	



FD-613 to FD-634

FILTER FUNNELS, ***SintaGlass,*** plate diameter 10 mm. FD-613 to FD-624 are to BS 1428 Part F1.

Capacity	1	3	6 ml	
Height above plate	15	40	100 mm	
Porosity		List Numbers		
1	—	**FD-621**	—	
3	**FD-613**	**FD-623**	**FD-633**	
4	**FD-614**	**FD-624**	**FD-634**	
Ten	**£4·90**	**4·90**	**5·10**	*a*
Each	**£0·55**	**0·55**	**0·57**	

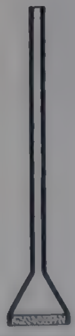


FD-643

FD-643

FILTER TUBE, ***SintaGlass,*** for use inside a 15 ml centrifuge tube. With 10 mm dia. porosity 3 sintered plate. Height 45 mm, capacity approx. 3 ml.

Ten **£5·10** Each **£0·57** *a*



FD-654

FD-654

IMMERSION FILTER, (Filter Stick) ***SintaGlass,*** Pregl pattern to BS 1428 Part F1. With 10 mm dia. porosity 4 sintered plate. Overall length 60 mm.

Ten **£7·40** Each **£0·82** *a*

All items on this page normally available from stock.

FD-704
FD-706

FD-708
FD-710

FD-835 with receiver

FD-850

FD-860

POROUS STAINLESS STEEL FILTERS

The disks are 3 mm thick and have a maximum carbon content of 0·2%. The porosities available have average pore sizes as follows:

Porosity	1	2	3	4
Average pore size, µm	70	46	28	6·5

Disks can be cleaned by boiling in 20% caustic soda solution or 15% nitric acid solution.

FD-704
FILTER FUNNEL, Buchner, as specification, with disk dia. 6·5 cm. With funnel, Buchner top, silicone rubber washer, two screwed rings for clamping, and **porosity 1** disk unless otherwise specified when ordering. Each **£9·75** *m*

FD-706
FILTER FUNNEL, Buchner, as FD-704, but with disk dia. 10·3 cm ... ... Each **£18·50** *m*

FD-708
FILTER, PIPELINE, as specification, with disk 6·5 cm dia. With inlet and outlet funnels, silicone rubber washer, two screwed rings for clamping, and **porosity 1** disk unless otherwise specified when ordering ... Each **£10·00** *m*

FD-710
FILTER, PIPELINE, as FD-708, but with disk dia. 10·3 cm ... ... Each **£18·00** *m*

REPLACEMENT PARTS

For filters 6·5 cm dia.

FD-719	**Screwed rings**	Pair	**£3·50**	*m*
FD-722	**Funnel**	Each	**£2·60**	*m*
FD-723	**Buchner top**	Each	**£2·40**	*m*
FD-725	**Filter disk.** State porosity 1, 2, 3 or 4 when ordering.	Each	**£1·10**	*m*
FD-726	**Washer, silicone rubber**	Each	**£0·40**	*m*

For filters 10·3 cm dia.

FD-729	**Screwed rings**	Pair	**£7·00**	*m*
FD-732	**Funnel**	Each	**£4·50**	*m*
FD-733	**Buchner top**	Each	**£4·75**	*m*
FD-735	**Filter disk.** State porosity 1, 2, 3 or 4 when ordering.	Each	**£1·75**	*m*
FD-736	**Washer, silicone rubber**	Each	**£0·40**	*m*

MISCELLANEOUS FILTERS

***FD-835**
FILTER, Buchner type, polythene, for vacuum filtration using 11 cm dia. filter paper. In two pieces for ease of cleaning. With nozzle for 6·5 mm bore vacuum tubing and gasket to seal the filter on receivers with necks from 26 to 65 mm i.d. The top has a capacity of approximately 750 ml ... ... Each **£2·85** *m*

***FD-850**
FILTER, centrifugal. Comprising a 250W electric motor with perforated aluminium basket 15 cm dia. × 5 cm high rotating in transparent plastics bowl with lid. The basket has a nylon gauze strainer for coarse filtration or crystal drying. For finer filtration, filter paper strip 5 cm wide (e.g. CK-515 &c.) can be used. With drain spout and entry port so that continuous filtration can be carried out. For 220/250V a.c. supplies only. Overall dimensions 18 cm dia. 28 cm high. Weight 4 kg ... ... Each **£14·40** *m*

FD-860
FILTER, pressure, for water, to be permanently fixed to water supply. Output approx. 100 litres/hour with inlet water supply pressure of 2·8 kgf/cm². Complete with wall bracket and instructions ... Each **£7·25** *m*

FD-862 **Spare cylinder,** 25 × 5 cm ... ... Each **£0·71** *m*

All items on this page normally available from stock.

FIRE EXTINGUISHERS

FF-300

EXTINGUISHER, non-toxic bromochlorodifluoromethane (BCF). A highly effective agent for small oil, solvent and electric fires. In handy aerosol container with mounting bracket. Dozen **£15·00** Each **£1·40** *m*

FF-320

EXTINGUISHER, carbon tetrachloride, one quart, for oil, solvent and electric fires. Must be used with caution in confined spaces. Double action pump provides continuous jet. With wall bracket and initial charge. Each **£6·00** *m*

FF-340

EXTINGUISHER, soda acid, 2 gallon, for wood and paper fires. With wall hook and initial charge. Each **£8·40** *mN*

FF-360

EXTINGUISHER, foam, 2 gallon, for oil and spirit fires. With wall hook and initial charge. Each **£9·75** *mN*

FF-380

EXTINGUISHER, foam, 1 gallon, as FF-360. Each **£9·30** *mN*

FF-400

EXTINGUISHER, carbon dioxide, 2½ lb, with squeeze grip control valve, for all types of small fires. With initial charge ... ... Each **£14·50** *mN*

FF-440

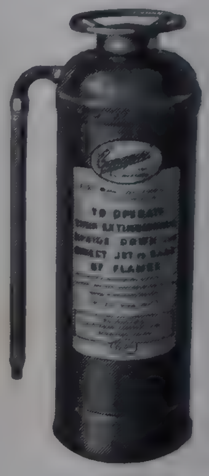
ASBESTOS BLANKET, 150×150 cm (5×5 ft), in metal container ... ... Each **£9·00** *m*

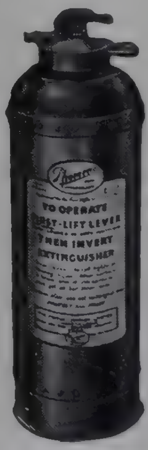
FF-460

FIRE BUCKET, rigid polythene, D shape, coloured red with 'FIRE' blocked in black. Dimensions approx. 28×28×25 cm, capacity 9 litres ... Each **£0·67** *m*

FF-300

FF-320


FF-340


FF-360
FF-380

FF-400

FF-460

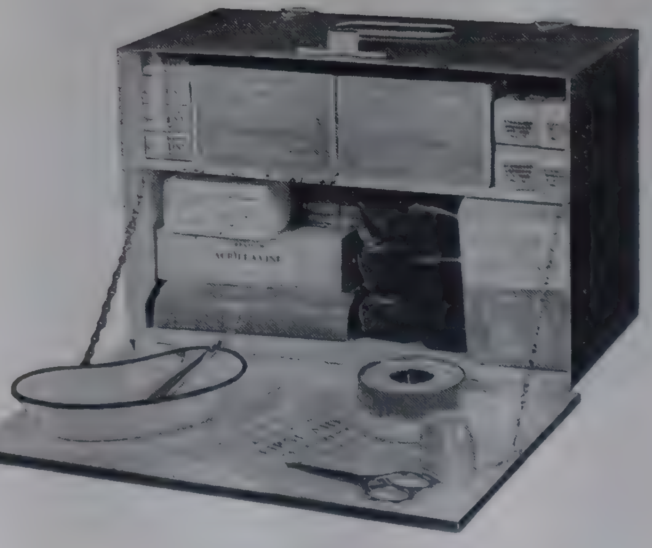
FIRST AID

FF-820

FIRST AID CABINET, 32 cm wide×10 cm high×22 cm deep. Grey mottled enamelled case with lugs for wall fixing. Contains dressings and sundries to comply with Home Office Factory Regulations with extras, bottle TCP, tube Acriflavine cream; scissors; tweezers; eye bath; 6·3×90 cm dressing strip; and 15 cm kidney tray. Suitable for up to 50 people ... ... Each **£5·85** *m*

FF-840

FIRST AID CABINET, 32 cm wide×17 cm high×22 cm deep. Grey mottled enamelled case with lugs for wall fixing. Contains dressings and sundries to comply with Home Office Factory Regulations with extras, bottle TCP; tube Acriflavine cream; scissors; tweezers; eye bath; 6·3×90 cm dressing strip; and 15 cm kidney tray. Suitable for 50 to 150 people ... ... Each **£7·85** *m*


FF-840

APRONS
COATS
GLOVES
GOGGLES } see **Clothing, protective**

SAFETY SHIELD
POISONS CUPBOARD } see **Furniture**

Items on this page normally available from stock except those coded *N*.

Gallenkamp FLAME ANALYSER

FOR FLAME PHOTOMETRIC DETERMINATIONS OF SODIUM, POTASSIUM AND CALCIUM

Applications include:

- **Biochemical and clinical samples**
- **Pharmaceuticals and cosmetics**
- **Plant and animal tissues**
- **Fertilisers and foods**
- **Water and oils**
- **Cement, glass and ceramics**

FH-500

- ■ **High sensitivity—5 ppm K and 2 ppm Na full scale**
- ■ **Good linearity characteristics**
- ■ **Insignificant cross interference**
- ■ **Negligible drift**
- ■ **Accurate readings from 0·5 ml sample**

Technical Data:

Sodium 2 ppm (0·085 mE/l) f.s.d. at maximum sensitivity.

Potassium 5 ppm (0·125 mE/l) f.s.d. at maximum sensitivity.

Calcium see notes under FH-545.

Sample uptake rate: 4 ml/min.

Volume per reading: 0·5 ml.
(For highest accuracy the average of several readings should be taken).

Repeatability: 1%.

Cross interference: normally <5% for 100-fold excess of cation.

Accuracy of analysis

Quantitative analysis is only as good as the **specificity** of the method. In flame photometry it is essential that the instrument isolates the element to be determined and that other similar elements should not affect the readings.

In the *Gallenkamp* **Flame Analyser the cross interference from a 100-fold excess of interfering cation is normally less than 5%** for sodium and potassium. This means that, in the great majority of cases, interference is completely negligible.

The Flame Analyser has excellent linearity characteristics and, for many purposes, it can be assumed that the galvanometer reading is proportional to the concentration of the solution. For the highest accuracy work, however, a calibration curve should be prepared.

Also, when accuracy is vital, the average of several readings should be taken but, since **the Flame Analyser requires only 0·5 ml sample per reading,** this does not involve large quantities of sample.

For calcium determinations see FH-545.

Gallenkamp FLAME ANALYSER

REGD. TRADE MARK

DESIGN FEATURES

- **Suitable for town (coal) gas, natural (methane) gas, bottled gas and petrol-air gas**
- **Controls recessed to prevent inadvertent alteration**
- **All components easily and completely accessible**
- **Robust galvanometer simply adjusted**
- **Convenient flick-over filter turret**
- **All parts corrosion resistant—camera black interior**

A non-conducting collar in the burner head ensures that the temperature, and hence the geometry, of the mixing chamber rapidly stabilises. For this reason the warming up period is virtually negligible.

Surplus liquid from the atomiser chamber is drawn off by a siphon drain which may be fed out to a sink at any distance away. The siphon prevents gas being drawn down the outlet and any consequent dip in reading when sufficient drain-off has collected in the tube to overcome surface tension and run off to the sink.

All working parts except the galvanometer scale are mounted on a rigid base over which is fitted a fibreglass cover. This construction simplifies cleaning and servicing since all components are accessible when the cover is removed without the need to detach controls or service connections. The atomiser burner tube assembly, placed behind a removable side cover, is detached for cleaning by loosening a single milled nut.

The lay-out is designed to leave only the galvanometer scale facing the operator and so to avoid distraction. All controls are conveniently situated and easy to adjust.

Services required

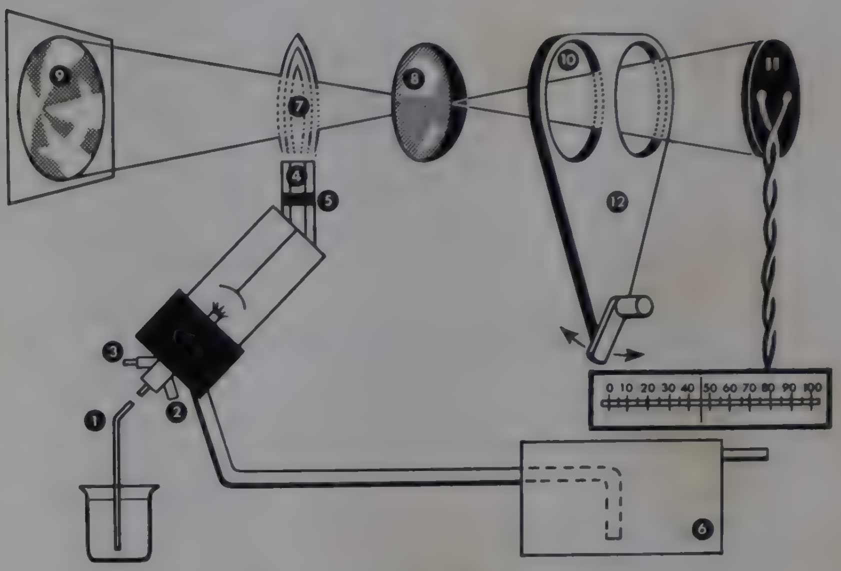
Compressed air (clean, oil free): 1·0 kgf/cm² (15 lbf/in²) max.

Gas supply: coal gas (4 to 6 in w.g.), natural (methane) gas (6 to 8 in w.g.), or butane, propane, petrol-air gas (4 to 10 in w.g.).

Electricity: 100/120 and 200/250V a.c.

Dimensions and weight

Overall	380 × 200 × 400 mm high
Weight	8 kg



SCHEMATIC DIAGRAM

1. Sample take-up tube
2. Compressed air inlet
3. Gas inlet
4. Burner head
5. Non-conducting collar
6. Siphon drain
7. Flame
8. Lens
9. Reflector
10. Filter
11. Photocell
12. Filter turret

ACCESSORIES

The recommended air compressor delivers clean air and will be found very satisfactory in service. A small pack of expendable polystyrene beakers is supplied with each instrument.

Standard solutions and distilled water must be stored in plastics bottles (glass is NOT suitable); a suitable range is listed under BOTTLES and List No. BT-205 is especially recommended.

FH-500

FLAME ANALYSER, *Gallenkamp*, as specification, with sodium and potassium filters, plastics dust cover, and one dozen plastics beakers. For 100/120 and 200/250V a.c. single phase supplies ... Each **£152·00** *g*

Instruments can be supplied for battery operation. Prices on application.

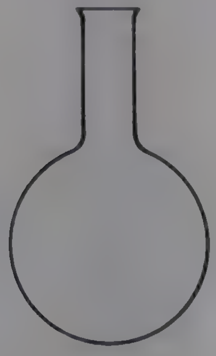
REPLACEMENT PARTS

FH-510	**Atomiser**	Each	**£6·50**	*b*
FH-516	**Filter,** sodium	Each	**£1·16**	*m*
FH-518	**Filter,** potassium	Each	**£1·16**	*m*
FH-525	**Photocell**	Each	**£4·00**	*m*
FH-540	**Dust cover,** plastics	Each	**£1·30**	*c*

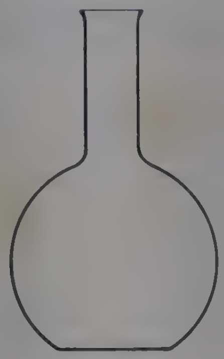
ACCESSORIES

FH-545	**Filter,** calcium. Recommended only where the calcium is isolated from interfering cations, or where compensation for interference may be effected either by arithmetic correction or by doping the standard solution.	Each	**£15·00**	*m*
AF-510	**Air compressor**	For details and prices see entries in List No. sequence.		
BJ-840	**Beakers,** plastics			
BT-205	**Bottles,** plastics			

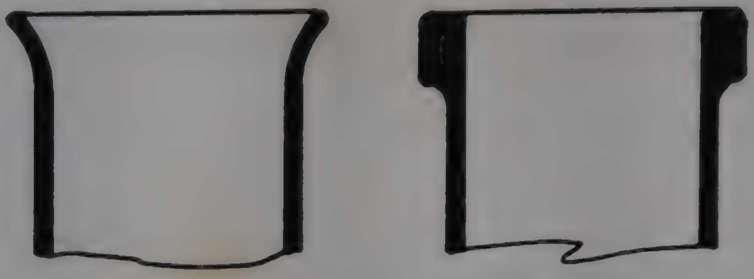
All items on this page normally available from stock.



FJ-010



FJ-030



up to 55 mm dia.
vial neck **V**

over 55 mm dia.
tooled ring **TR**

Neck finishes for *Pyrex brand* flasks

ROUND BOTTOM FLASKS

FJ-010

FLASKS, round bottom, *Pyrex brand* glass.

Capacity	25	50	100	250 ml	
Neck finish	V	V	V	V	
Std. pack qty.	12	96	72	72	
Std. pack	£1·80	12·95	10·70	13·30	d
Dozen	£ —	1·80	1·95	2·40	
Each	£0·22	0·22	0·23	0·27	

Capacity	500	1000	2000 ml	
Neck finish	V	V	V	
Std. pack qty.	48	36	18	
Std. pack	£12·50	13·45	11·60	d
Six	£ 1·75	2·45	—	
Each	£ 0·34	0·45	0·76	

Capacity	3	4	5	10	20 litres	
Neck finish	V	V	TR	TR	TR	
Std. pack qty.	12	6	6	4	1	
Std. pack	£11·55	6·60	9·15	12·50	—	d
Each	£ 1·08	1·20	1·65	3·30	4·60	

FLAT BOTTOM FLASKS

FJ-030

FLASKS, flat bottom, *Pyrex brand* glass.

Capacity	50	100	250 ml	
Neck finish	V	V	V	
Std. pack qty.	120	144	72	
Std. pack	£17·30	23·35	14·25	d
Dozen	£ 1·95	2·20	2·60	
Each	£ 0·23	0·25	0·28	

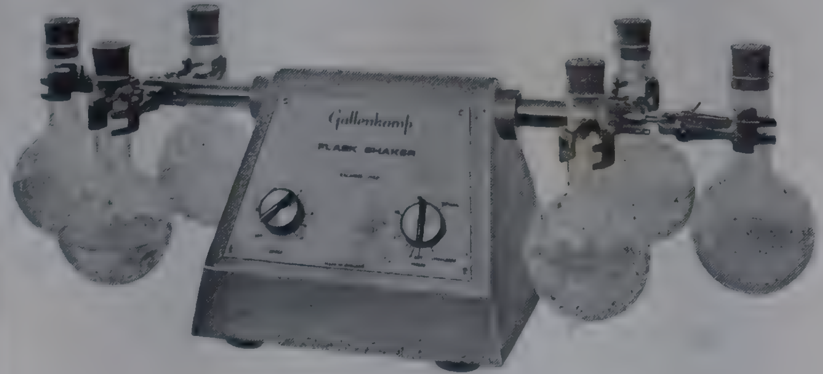
Capacity	500	1000	2000 ml	
Neck finish	V	V	V	
Std. pack qty.	60	36	18	
Std. pack	£15·95	14·25	12·05	d
Six	£ 1·80	2·60	—	
Each	£ 0·35	0·47	0·80	

Capacity	3	5	10 litres	
Neck finish	V	TR	TR	
Std. pack qty.	12	6	4	
Std. pack	£11·50	6·70	12·60	d
Each	£ 1·08	1·20	3·40	

Gallenkamp FLASK SHAKER

REGD TRADE MARK

For dissolving, dispensing, extracting and other applications.



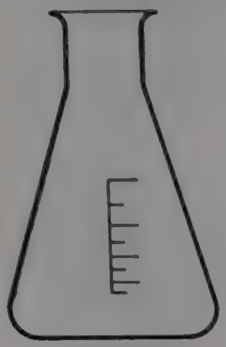
SD-110 with flasks

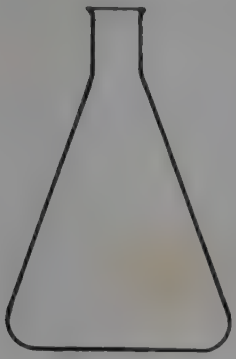
- **Accepts up to six 500 ml flasks**
- **Positive grip clamps**
- **Speeds up to 800 oscillations/min**
- **Integral 0 to 20 minute timer**

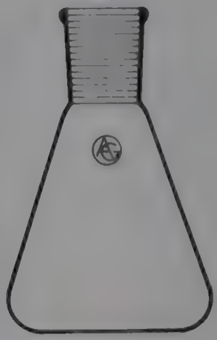
Available for 220/240V and 110/120V 50/60 Hz single phase supplies.

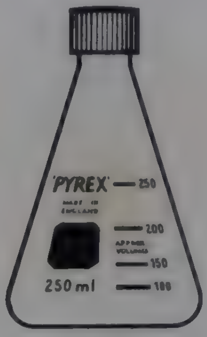
See SD-110 in List No. sequence.

All items on this page normally available from stock.

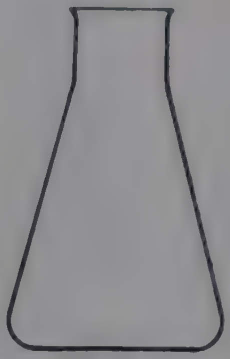

FJ-050


FJ-052


FJ-058



FJ-065


FJ-070

NARROW MOUTH CONICAL FLASKS

(ERLENMEYER FLASKS)

FJ-050

FLASKS, conical, narrow mouth, *Pyrex brand* glass. With two or more graduations showing approximate capacities. All sizes with vial neck as illustration on opposite page.

Capacity	5	10	25	50 ml	
Std. pack qty.	60	60	120	144	
Std. pack	£7·85	7·85	15·65	19·45	d
Dozen	£1·70	1·70	1·75	1·80	
Each	£0·21	0·21	0·22	0·22	

Capacity	100	150	250 ml	
Std. pack qty.	144	72	72	
Std. pack	£18·80	9·70	11·65	d
Dozen	£ 1·75	1·75	2·10	
Each	£ 0·22	0·22	0·24	

Capacity	300	500	1000 ml	
Std. pack qty.	72	72	36	
Std. pack	£13·30	15·25	13·30	d
Six	£ 2·40	2·80	4·70	
Each	£ 0·27	0·30	0·45	

Capacity	2	3	5 litres	
Std. pack qty.	24	15	6	
Std. pack	£15·00	13·70	8·10	d
Each	£ 0·72	1·04	1·45	

FJ-052

FLASKS, conical, narrow mouth, *Firmasil* glass.

Capacity	100	250	500 ml	
Ten	£1·25	1·35	1·80	d
Each	£0·19	0·20	0·25	

FJ-058

FLASKS, conical, narrow mouth with interchangeable socket, Ⓐ, borosilicate glass. Socket 24/29 without stopper.

Capacity	100	250	500	1000 ml	
Ten	£4·70	5·10	5·70	7·40	a
Each	£0·52	0·57	0·64	0·82	

ACCESSORIES

SU-520	**Stopper, borosilicate glass, cone 24/20**	For prices see entries in List No. sequence.
SU-710 **SU-712**	**Stoppers, polypropylene, cone 24/29**	

FJ-065

FLASKS, conical, *Pyrex brand* glass, **narrow mouth with screw cap.** Can be autoclaved at 121°C. With two or more graduations showing approximate capacity.

Capacity	50	100	250	500	1000 ml	
Std. pack qty.	12	12	12	12	12	
Std. pack	£5·50	5·85	6·00	6·70	10·25	d
Each	£0·52	0·55	0·56	0·62	0·96	

REPLACEMENT PARTS

FJ-067 **Caps, with inert liner. In packs of 24.**

For flasks	50/100	250/500	1000 ml	
Pack	£1·15	1·50	2·55	d

WIDE MOUTH CONICAL FLASKS

FJ-070

FLASKS, conical, wide mouth, *Pyrex brand* glass. Illustration of neck finishes see opposite page.

Capacity	50	100	250 ml	
Neck finish	V	V	V	
Std. pack qty.	144	96	72	
Std. pack	£17·50	12·95	12·30	d
Dozen	£ 1·65	1·80	2·25	
Each	£ 0·21	0·22	0·25	

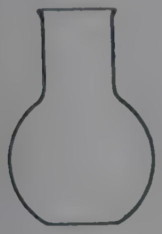
Capacity	500	1000	2000 ml	
Neck finish	V	V	TR	
Std. pack qty.	48	36	24	
Std. pack	£10·80	13·75	14·45	d
Six	£ 1·50	2·50	—	
Each	£ 0·31	0·46	0·70	

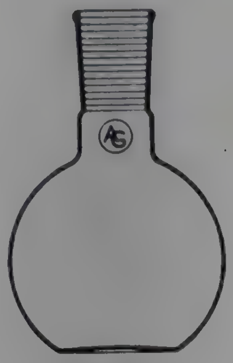
BJ-695 **BEAKERS**, conical form, capacities 125 to 1000 ml.
BJ-725 **BEAKER FLASKS**, capacities 200 to 500 ml.
CX-350 **CULTURE FLASK**, conical, capacity 1000 ml.

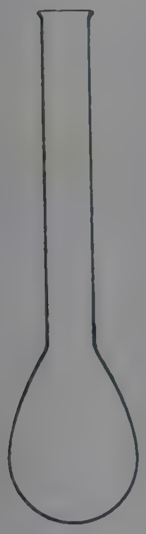
For details see entries in List No. sequence.

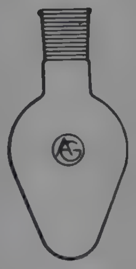
QUANTITY DISCOUNTS for glassware in bulk quantities see 'Conditions of Sale' at front of catalogue.

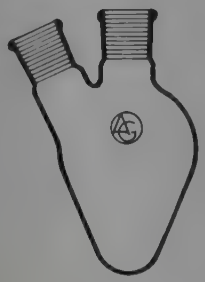
All items on this page normally available from stock.


FJ-100


FJ-110


FJ-160
FJ-170


FJ-195


FJ-196

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

EXTRACTION FLASKS

FJ-100

FLASKS, extraction, *Pyrex brand* glass, with flat bottom and wide vial neck.

Capacity	100	150	250 ml	
Std. pack qty.	96	72	120	
Std. pack	£16·45	12·65	24·30	d
Dozen	£ 2·30	2·30	2·70	
Each	£ 0·26	0·26	0·29	

FJ-110

FLASKS, extraction, flat bottom, Ⓐ, short neck with standard socket, borosilicate glass.

Capacity	150	250	500 ml	
Socket	24/29	24/29	29/32	
Ten	£4·90	5·10	6·00	a
Each	£0·55	0·57	0·66	

EV-570

FLASK, extraction, to ASTM D297, *Pyrex brand* glass. See entry in List No. sequence.

KJELDAHL FLASKS

FJ-160

FLASKS, Kjeldahl with long neck, *Pyrex brand* glass.

Capacity	50	100	200 ml	
Std. pack qty.	144	36	72	
Std. pack	£31·10	8·25	22·05	d
Dozen	£ 2·95	2·90	4·00	
Each	£ 0·31	0·31	0·40	
Capacity	300	500	800 ml	
Std. pack qty.	60	36	36	
Std. pack	£19·70	13·45	16·20	d
Six	£ 4·30	4·80	2·95	
Each	£ 0·42	0·45	0·53	

FJ-170

FLASK, Kjeldahl, micro, borosilicate glass, capacity 30 ml ... ... Ten **£2·45** Each **£0·31** a

SEMI-MICRO FLASKS

FJ-195

FLASK, semi-micro, Ⓐ, pear shape, short neck with 14/15 socket.

Capacity	10	30 ml	
Ten	£4·70	4·80	a
Each	£0·52	0·53	

FJ-196

FLASK, semi-micro, Ⓐ, pear shape with 2 necks 14/15 sockets, capacity 30 ml, borosilicate glass.
Ten **£8·80** Each **£0·98** a

FD-606

FLASKS, semi-micro, Ⓐ, conical, capacities 10 and 25 ml with 14/15 socket neck. For prices see entry in List No. sequence.

QUANTITY DISCOUNTS for glassware in bulk quantities see 'Conditions of Sale' at front of catalogue.

All items on this page normally available from stock.

THORPE AND IODINE FLASKS

FJ-210

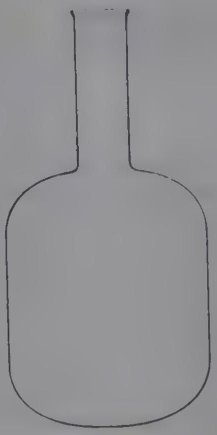
FLASK, Thorpe's revenue, *Pyrex brand* glass. Capacity 750 ml. Std. pack qty. 6.

Std. pack	£2·15	Each	£0·41	*d*

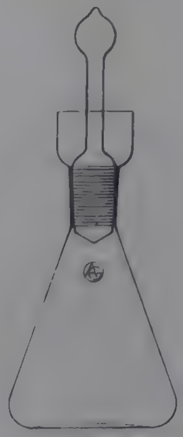
FJ-260

FLASK, iodine determination, AG, borosilicate glass. Conical with cup shaped neck and long handled stopper, cone and socket 24/29. Capacity 250 ml.

Ten	£14·00	Each	£1·55	*a*



FJ-210



FJ-260

FILTER FLASKS

FJ-280

FLASKS, filter, with side arm, heavy wall, *Pyrex brand* glass, conforming dimensionally to BS 1739. Neck finish as illustrated on page 254.

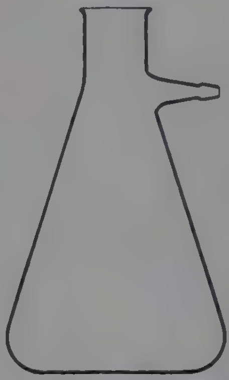
Capacity	100	250	500	1000 ml	
Neck finish	V	V	V	V	
Std. pack qty.	36	36	24	18	
Std. pack	£17·55	20·40	19·05	18·00	*d*
Each	£ 0·58	0·66	0·92	1·16	

Capacity	2	4	5	10 litres	
Neck finish	V	V	V	TR	
Std. pack qty.	12	6	4	4	
Std. pack	£17·25	16·50	16·40	18·25	*d*
Each	£ 1·60	3·00	4·30	4·90	

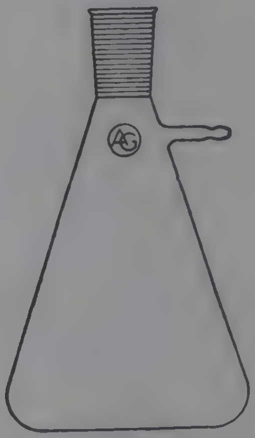
FJ-290

FLASKS, filter, AG conical, heavy wall borosilicate glass with sidearm and 29/32 socket.

Capacity	500	1000 ml	
Ten	£13·00	15·00	*a*
Each	£ 1·45	1·70	



FJ-280



FJ-290

DISTILLATION FLASKS

FJ-298

FLASKS, distillation, *Pyrex brand* glass, with side arm.

Capacity	100	150	250 ml	
Std. pack qty.	36	36	24	
Std. pack	£15·90	16·55	13·50	*d*
Each	£ 0·52	0·54	0·66	

Capacity	500	1000	2000 ml	
Std. pack qty.	18	12	6	
Std. pack	£11·65	9·20	6·05	*d*
Each	£ 0·76	0·86	1·10	

FJ-300

FLASKS, distillation, *Pyrex brand* glass, conforming dimensionally to BS 658.

Capacity	100	150 ml	
Std. pack qty.	36	36	
Std. pack	£17·05	18·25	*d*
Dozen	£ 6·00	6·40	
Each	£ 0·56	0·60	

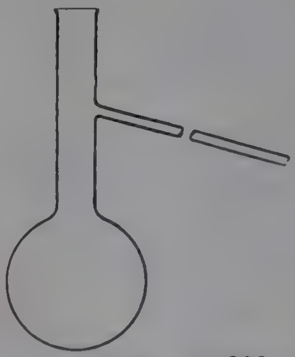
FJ-320

FLASK, Claisen distillation, *Pyrex brand* glass, with side arm on wide branch tube. Capacity 250 ml.

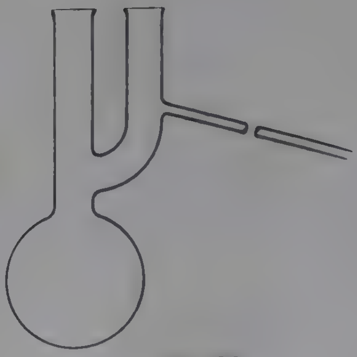
Std. pack of 12	£8·20	Each	£0·76	*d*

PE-797 et seq.

FLASKS, distillation, to IP and ASTM specifications, see entry in List No. sequence.



FJ-298, FJ-300



FJ-320

FLASKS

Culture	see CULTURE
Extraction	see EXTRACTION
Quickfit	see QUICKFIT APPARATUS
Standard joint	see QUICKFIT APPARATUS
Sulphonation	see PETROLEUM TESTING
Vacuum	see VACUUM VESSELS

All items on this page normally available from stock.

Technico VOLUMETRIC FLASKS

REGD. TRADE MARK

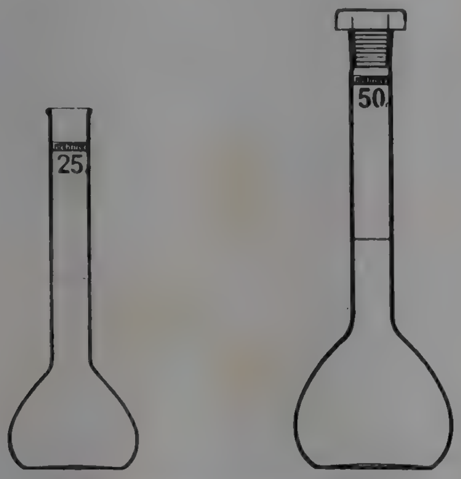
ONE MARK FLASKS TO BS 1792

Technico one mark volumetric flasks are manufactured in our own works in accordance with the requirements of BS 1792 (sizes not included in the BS are on a similar basis). Stoppered flasks have interchangeable neck grinding to BS 572 and sizes 1 to 50 cm^3 Class B and 5 to 50 cm^3 Class A all have the same 10/13 stopper size for added convenience and interchangeability. The small flasks in Class B have necks which will accept pipettes up to 8·5 mm dia. Stoppered flasks are supplied complete with hexagon head dust-proof polypropylene stoppers. These stoppers are inert to almost all reagents, will not stick, will prevent entrance of dust and give good protection against chipping. If occasionally for special purposes glass stoppers are essential, then stoppers SU-520 can be used.

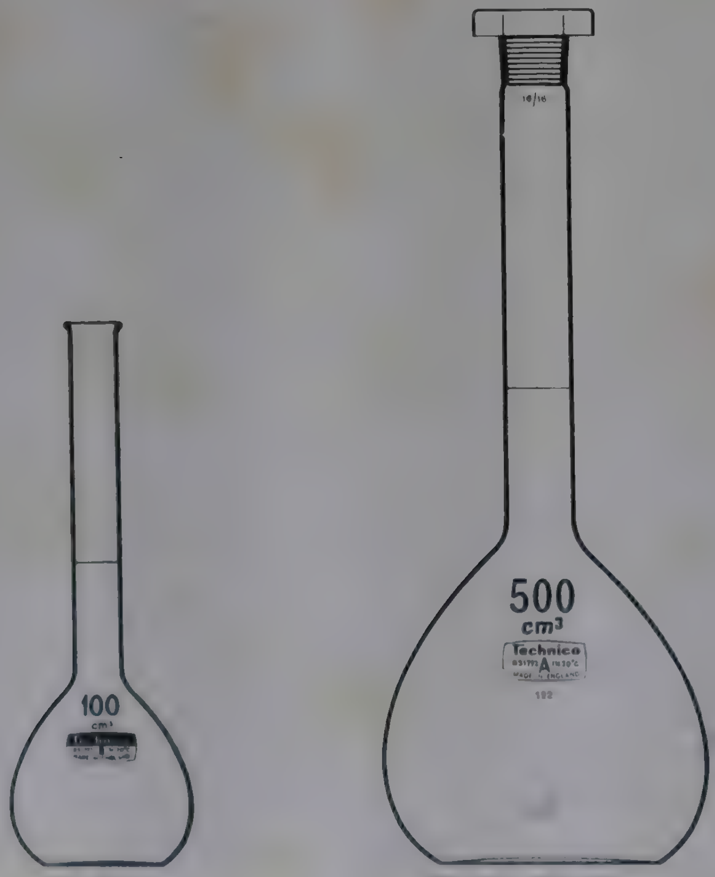
Capacity cm^3	1 *	2 *	5	10	20 *	25	50
Stopper size	10/13	10/13	10/13	10/13	10/13	10/13	10/13
Tolerance Class B ± cm^3 Class A ± cm^3	0·04 —	0·04 —	0·04 0·02	0·04 0·02	0·06 0·03	0·06 0·03	0·1 0·05

Capacity cm^3	100	200	250	500	1000	2000
Stopper size	12/14	14/15	14/15	16/16	19/17	24/20
Tolerance Class B ± cm^3 Class A ± cm^3	0·15 0·08	0·3 0·15	0·3 0·15	0·5 0·25	0·8 0·4	1·2 0·6

* Sizes not included in BS 1792.



FK-054 **FK-074**
Small sizes Class B
Wide neck



FK-054 **FK-074, FK-076, etc.**
Larger sizes classes A and B

PLAIN NECK FLASKS WITHOUT STOPPER

With permanent graduations and inscriptions in amber stain.

FK-054

FLASKS, *Technico*, **Class B,** plain neck, as specification.

Capacity	10	25	50 cm^3	
Dozen	£3·50	3·90	4·10	a
Each	£0·36	0·39	0·40	

Capacity	100	250	500 cm^3	
Dozen	£4·40	5·40	7·00	a
Each	£0·43	0·51	0·66	

GROUND NECK FLASKS WITH DUSTPROOF STOPPERS

With permanent graduations and inscriptions in amber stain.

FK-074

FLASKS, *Technico*, **Class B,** as specification, with interchangeable polypropylene stopper.

Capacity	1 *	2 *	5	10	20 * cm^3	
Dozen	£3·60	3·60	3·60	4·00	4·60	a
Each	£0·36	0·36	0·36	0·40	0·44	

Capacity	25	50	100	200 cm^3	
Dozen	£4·60	4·90	5·40	6·20	a
Each	£0·44	0·47	0·51	0·58	

Capacity	250	500	1000	2000 cm^3	
Dozen	£6·60	8·00	10·80	18·50	a
Each	£0·62	0·76	1·02	1·75	

* Sizes not included in BS 1792.

When ordering specify *Technico* volumetric glassware.

All items on this page normally available from stock.

Technico VOLUMETRIC FLASKS

REGD. TRADE MARK

ONE MARK FLASKS TO BS 1792

GROUND NECK FLASKS WITH DUSTPROOF STOPPERS

With permanent graduations and inscriptions in amber stain.

FK-076

FLASKS, *Technico*, **Class A**, as specification, with interchangeable polypropylene stopper.

Capacity	5	10	20 *	25	50	100 cm³	
Dozen	£6·40	6·60	7·20	7·20	7·80	8·00	a
Each	£0·60	0·62	0·68	0·68	0·74	0·76	

Capacity	200	250	500	1000	2000 cm³	
Dozen	£9·00	9·00	11·40	14·60	24·00	a
Each	£0·84	0·84	1·06	1·40	2·25	

FK-077

FLASKS, *Technico*, **Class A with works certificate of examination** stating volume of the flask at 20°C. With interchangeable polypropylene stopper.

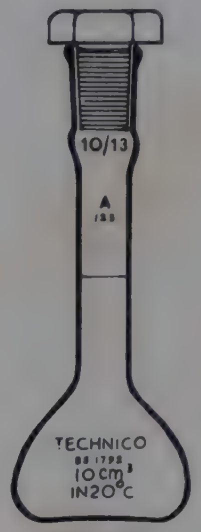
Capacity	5	10	20 *	25	50	100 cm³	
Dozen	£8·60	8·80	9·40	9·40	10·00	10·20	a
Each	£0·80	0·82	0·88	0·88	0·94	0·96	

Capacity	200	250	500	1000	2000 cm³	
Dozen	£11·20	11·20	13·60	16·80	26·20	a
Each	£1·06	1·06	1·30	1·60	2·50	

* **Sizes not included in BS 1792.**

NOTE: FLASKS, *Technico*, **Class A** with British Standard Test (BST) certificate. Available to special order.

When ordering specify *Technico* volumetric glassware.



FK-076
Small sizes Class A
Narrow neck

AMBER GLASS FLASKS

FK-084

FLASKS, *Technico*, **Class B** low-actinic **amber stained glass** with interchangeable polypropylene stopper. Shape as FK-074.

Capacity	25	50	100	250	500	1000 cm³	
Dozen	£7·00	7·20	8·40	10·00	12·20	17·50	a
Each	£0·66	0·68	0·78	0·94	1·14	1·65	

SU-520

STOPPERS, (AG), **borosilicate glass**, to BS 572, suitable for use with *Technico* volumetric flasks. For details and prices see entry in List No. sequence.

PYREX BRAND VOLUMETRIC FLASKS

FK-094

FLASKS, to BS 1792, *Pyrex brand* glass, **Class B**, with interchangeable solid glass stopper.

Capacity	25	50	100	250 cm³	
Std. pack qty.	12	12	12	12	
Std. pack	£12·50	12·65	13·55	13·90	d
Each	£ 1·18	1·18	1·25	1·30	

Capacity	500	1000	2000 cm³	
Std. pack qty.	6	6	1	
Std. pack	£7·90	9·10	—	d
Each	£1·45	1·65	2·30	

FK-096

FLASKS, to BS 1792, *Pyrex brand* glass, **Class A**, with interchangeable solid glass stopper.

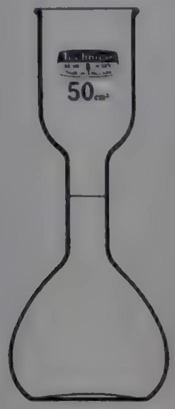
Capacity	25	50	100	250 cm³	
Std. pack qty.	12	12	12	12	
Std. pack	£15·20	16·50	19·45	18·60	d
Each	£ 1·45	1·55	1·80	1·80	

Capacity	500	1000	2000 cm³	
Std. pack qty.	6	6	1	
Std. pack	£9·90	11·40	—	d
Each	£1·80	2·05	2·80	

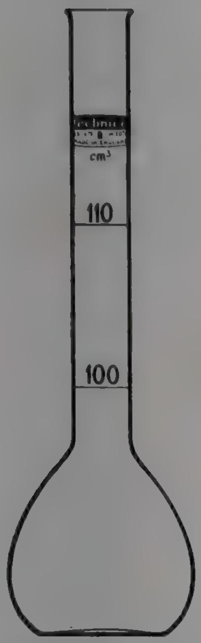
All items on this page normally available from stock.

Technico VOLUMETRIC FLASKS

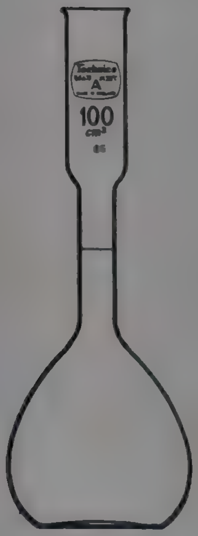
REGD. TRADE MARK



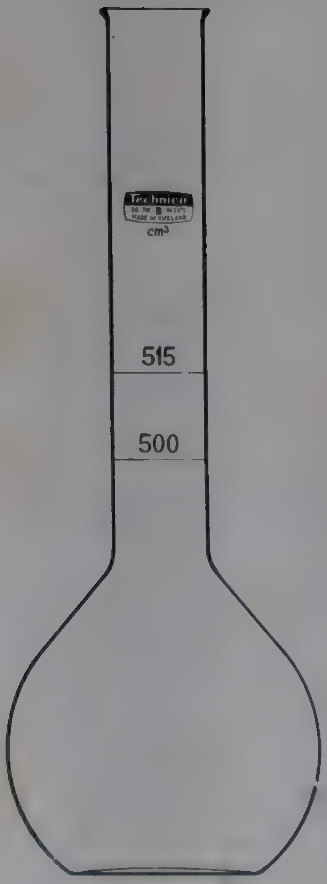
FK-134



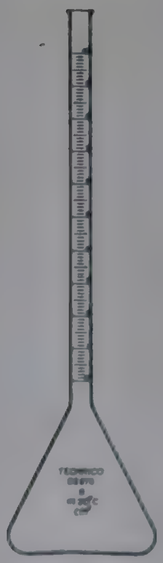
FK-164



FK-176



FK-204



FK-244

KOHLRAUSCH FLASKS

With permanent graduations and inscriptions in amber stain.

FK-134

FLASKS, Kohlrausch, *Technico,* to BS 615, **Class B.**

Capacity	50	100	200 cm³	
Dozen	**£6·60**	**7·20**	**8·40**	*a*
Each	**£0·62**	**0·68**	**0·78**	

FK-136

FLASKS, Kohlrausch, *Technico,* to BS 615, **Class A.**

Capacity	50	100	200 cm³	
Dozen	**£10·80**	**12·60**	**14·00**	*a*
Each	**£ 1·02**	**1·18**	**1·30**	

SUGAR FLASKS

With permanent graduations and inscriptions in amber stain.

FK-164

FLASK, sugar, *Technico,* to BS 675 type 1, **Class B.** Capacity 100/110 cm³.
Dozen **£7·00** Each **£0·66** *a*

FK-176

FLASK, sugar, *Technico,* to BS 675 type 2, **Class A.** Capacity 100 cm³ with narrow neck.
Dozen **£16·50** Each **£1·55** *a*

BREWERS' MASH FLASKS

FK-204

FLASKS, brewers' mash, *Technico,* to BS 701, **Class B,** with two marks at 500 and 515 cm³.
Dozen **£10·40** Each **£0·98** *a*

HIRSCHSOHN FLASKS

FK-244

FLASKS, Hirschsohn, *Technico,* to BS 676, **Class B.**

Capacity of bulb	150	200 cm³	
Capacity of neck	10	25 cm³	
Neck subdivision	0·1	0·2 cm³	
Dozen	**£15·50**	**17·50**	*a*
Each	**£ 1·45**	**1·65**	

When ordering specify *Technico* volumetric glassware.

REGD. TRADE MARK

DB-800

FLASK, for methylene blue reduction test, capacity 800 cm³. For details and price see entry in List No. sequence.

PE-120

SULPHONATION FLASK, to ASTM D1019-IP 145. For details and price see entry in List No. sequence.

All items on this page normally available from stock.

Gallenkamp GAS FLOWMETERS

ORIFICE FLOWMETER

This gas flowmeter is a compact and robust instrument of the orifice type which measures the pressure drop across a jet. The jet is fitted into the main body which is bored out to form one limb of a manometer. The other limb is a glass tube fitted with an 8 cm adjustable scale, providing easy zero adjustment and clear reading. A fine adjustment needle valve is fitted as an integral part of the main body. The whole instrument can be dismantled easily for cleaning, topping-up or for jet changing. It is not suitable for corrosive gases.

INTERCHANGEABLE JETS

The flowmeters are available with any one of five interchangeable jets which together cover an effective air-flow range from 0·07 to 5 litres per minute.

CALIBRATION

A flowmeter will, on request, be fitted with a selected jet and calibrated, but for air only. The certificates of calibration which are supplied with such flowmeters show measured values at five points on the scale from which a calibration curve may be constructed.

FL-420
FLOWMETER, ORIFICE, *Gallenkamp*, as specification, with nozzles for rubber tubing connections.
Uncalibrated with one jet FL-430 ... Each **£13·50** *b*

FL-422
FLOWMETER, ORIFICE, *Gallenkamp*, as FL-420 but **calibrated** with jet as selected. Complete with jet and certificate of calibration ... ... Each **£14·75** *b*

When ordering please state jet size No. required.

FL-430
JETS, interchangeable, uncalibrated, for flowmeters FL-420 and FL-422, with washer.

No.	Range
1	0·07–0·25 litres/min
2	0·15–0·5 litres/min
3	0·4–1·25 litres/min
4	0·8–2·5 litres/min
5	1·5–5·0 litres/min

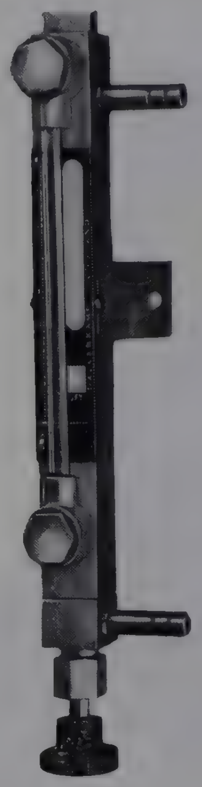
Each **£0·45** *b*

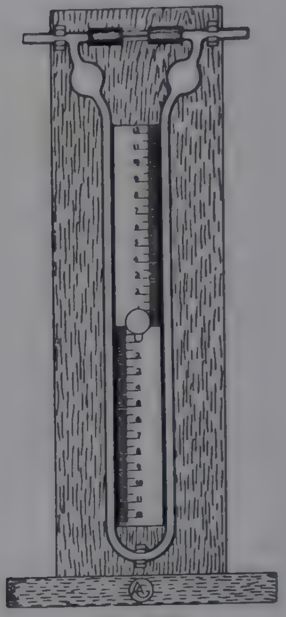
FL-432
JETS, as FL-430 but **calibrated. With certificate of calibration for air** ... ... Each **£1·70** *b*

REPLACEMENT PARTS

FL-434	**Gauge glass**	Pack of 5	£0·20	*b*
FL-435	**Spare washers for jets**	Pack of 10	£0·13	*b*

GAS METERS see GF-052 et seq. in List No. sequence.


FL-420


FL-550

CAPILLARY FLOWMETER

This flowmeter comprises a glass U-tube manometer across the top of which is connected a short length of precision bore capillary. Various ranges are obtained by inserting capillaries of different bores. The readings are taken on a 25 cm boxwood scale divided in mm with centre zero. The meter is mounted on a polished hardwood stand, to which the glass U-tube is attached by spring clips so that it may easily be removed for cleaning.

CALIBRATION

Flowmeters will, on request, be fitted with selected capillary tubes and calibrated, but for air only. The certificates of calibration which are supplied with such flowmeters show measured values at five points on the scale from which a calibration curve may be constructed.

FL-550
FLOWMETER, CAPILLARY, Ⓐ, as specification, with one capillary as selected. **Uncalibrated.**
Each **£7·50** *a*

When ordering please state required capillary Size No. as shown under List No. FL-554.

FL-552
FLOWMETER, CAPILLARY, Ⓐ, as FL-550 but **calibrated** with capillary as selected. **With certificate of calibration for air** ... ... Each **£9·00** *a*

FL-554
CAPILLARY TUBES, uncalibrated, covering the following air flow ranges.

Size No.	Range 0 to
1	10 ml/min
2	25 ml/min
3	50 ml/min
4	100 ml/min
5	250 ml/min
6	500 ml/min
7	1 litres/min
8	2·5 litres/min
9	5 litres/min
10	10 litres/min

Each **£0·20** *a*

FL-556
CAPILLARY TUBES as FL-554 but **calibrated. With certificate of calibration for air** ... Each **£1·70** *b*

REPLACEMENT PART

FL-558 **U-tube, borosilicate glass** ... ... Each **£0·80** *a*

All items on this page normally available from stock.

FLOWMETER LAB KIT

FOR MEASUREMENT OF RATE OF FLOW OF GASES AND LIQUIDS

FL-600

10
9
8
7
6
5
4
3
2

The meter gives continuous and direct measurements of rates of flow of gases and liquids in pipelines. Comprises a vertical glass metering tube with scale 100 mm long in which a floating indicator is supported by the upward flow. The float rotates steadily and without touching the metering tube so friction, and therefore wear, is eliminated. Positive scale readings are obtained.

CONSTRUCTION

The metering tubes are precision tapered bore tubes with cylindrical ends which allow a leak proof seal to be made with an 'O' ring located in a groove in each stainless steel nozzle connector. Nozzles are fitted for rubber tubing connections. A clip-on plastics front gives complete protection to the metering tube. Floats are in anodised aluminium or stainless steel depending upon the range. They are compact and thus allow the scale to occupy most of the tube length. The scale on the metering tube is legible and permanent.

Floats and metering tubes may be changed easily and quickly.

RANGES

The kit includes five metering tubes and nine floats which provide flow rates for air and water as shown below and for which calibration charts are supplied.

Standard ranges for air

Tube	Float	Range
A1	D	25 – 500 ml/min
A1	HS	50 – 1,000 ml/min
C6	D	100 – 2,000 ml/min
C6	HS	200 – 4,000 ml/min
B6	D	500 – 5,000 ml/min
B6	HS	1 – 10 l/min
A6	D	1 – 12 l/min
A6	HS	2·5 – 25 l/min
A10	D	5 – 50 l/min
A10	HS	10 – 100 l/min

Standard ranges for water

Tube	Float	Range
A1	SS	7·5 – 75 ml/min
B6	HS	25 – 250 ml/min
A6	HS	75 – 750 ml/min
A6	SS	150 – 1,500 ml/min
A10	HS	300 – 3,000 ml/min
A10	SS	500 – 5,000 ml/min

FL-600

FLOWMETER LAB-KIT, *Gapmeter*, as specification, comprising five metering tubes, nine floats, three pairs of nozzle connections, mounting frame and a demountable tripod stand. Any of the ten standard Gapmeter ranges for air from 25 ml/min to 100 l/min and six for water from 7·5 ml/min to 5 l/min may be readily assembled. Calibration charts are supplied for the sixteen ranges. Supplied in a wood carrying case with moulded foam-plastics compartments ... ... Each **£33·00** *m*

Replacement metering tubes and floats are available; details on application.

FLOW CUPS	see VISCOMETRY
FOIL, aluminium	see ALUMINIUM
FOIL, platinum	see PLATINUM
FORCEPS, balance weight	see BALANCE ACCESSORIES
FORCEPS, dissecting	see DISSECTING EQUIPMENT
FRACTIONATING COLUMNS	see DISTILLATION and QUICKFIT APPARATUS

All items on this page normally available from stock.

Gallenkamp
REGD TRADE MARK

FRACTION COLLECTOR

for volumetric and timed fraction cutting

- Simple drive mechanism
- Very large spillage capacity
- Low voltage operation
- Free standing collector plate
- Capacity 120 tubes
- Auto end-of-track arrest

A **low cost** apparatus especially suitable for schools, technical colleges, universities and general purpose industrial laboratory use.

For full details and prices see CL-270 to CL-292 in List No. sequence.

CL-270

FREEZE DRYING APPARATUS

For drying labile and other biological substances by the sublimation of ice from pre-frozen solutions contained in flasks.

PRINCIPLE

Ice can be removed from evenly distributed films of frozen solution at an average of 40 g/h using a vacuum of about 0·4 torr. The collecting trap should be immersed in a vacuum flask containing liquid air or solid CO_2–ethanol mixture to condense the evaporated moisture. The working capacity of the apparatus is approximately 500 ml.

CONSTRUCTION

The apparatus comprises a head with four sidearms each with a 24/29 socket on which four flasks are fitted. The head which has a 34/35 cone fits into the trap. A vacuum connector arm is situated at the top of the trap and the head is fitted with a vacuum release stopcock.

FM-320

FREEZE DRYING APPARATUS, Ⓐ, borosilicate glass, as specification, with head, trap, vacuum adapter, four 250 ml flasks and four pairs of spring connectors, 38 mm long ... ... Each **£12·25** *a*

REPLACEMENT PARTS

FM-322 **Head,** with 34/35 cone, four sidearms with 24/29 sockets, hooks for spring connectors and a vacuum release stopcock ... ... Each **£5·40** *a*

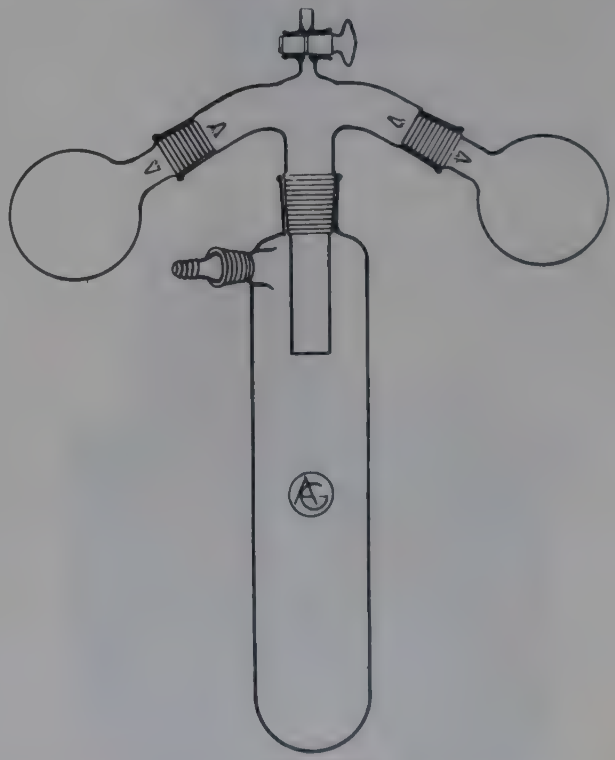
FM-324 **Trap,** with 34/35 socket and sidearm with 19/26 socket. Dia. 65 mm, length to neck 330 mm ... Each **£3·10** *a*

Q-MF10/2 **Adapter,** with 19/26 cone for vacuum connection. For price see entry in QUICKFIT APPARATUS.

FM-328 **Flasks,** with 24/29 cone and hooks for spring connectors.

Capacity	100	250	500 ml	
Ten	£6·60	7·40	8·60	*a*
Each	£0·74	0·82	0·96	

JR-140 **Spring connectors,** length 38 mm. For price see entry in List No. sequence.



FM-320

Suitable **vacuum flask** for refrigerant, see **VC-530,** 4500 ml.
Suitable **rotary pump,** single stage, see **VACUUM PUMPS.**

All items on this page normally available from stock.

FREEZE DRYING APPARATUS

For preserving or concentrating sensitive biological and similar substances which would be destroyed by ordinary drying.

MODEL EFI

MANIFOLD VERSION

For drying pre-frozen products, e.g. blood plasma in 250 ml MRC bottles or flasks with neck diameters of about 25 mm.

Technical Data

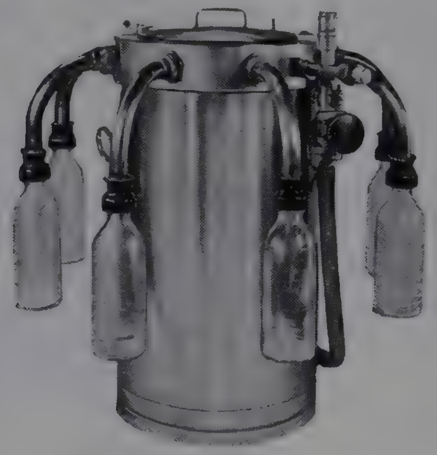
Condenser capacity	2·5 litres ice
Coolant charge	6 kg solid CO_2 plus 10 litres alcohol
Condenser temperature	−78°C
Capacity	8×250 ml MRC bottles or similar containers

FM-360

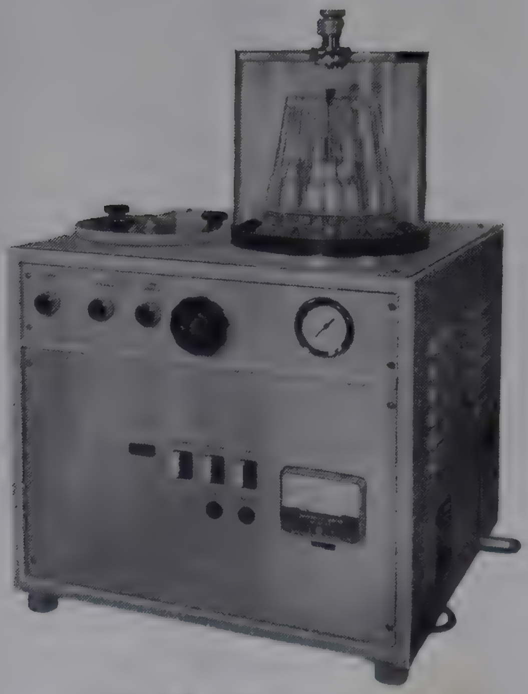
FREEZE DRYING APPARATUS, *Edwards* **Model EFI, manifold version,** as specification including rotary vacuum pump with valved connector, Pirani vacuum gauge, eight adapters for isolating individual ports, rubber adapters for MRC bottles and vacuum hose. For 220/240V a.c. single phase supplies ... ... Each **£386·70** *f*

ACCESSORY

FM-364 Spin freezer for MRC bottles ... ... Each **£65·00** *f*



FM-360 with bottles but without pump



FM-370 with ampoules

MODEL EFO3

STANDARD VERSION

A centrifugal freeze dryer for drying simultaneously up to 96 samples in 0·5 ml ampoules.

Technical Data

Capacity	96 ampoules 0·5 ml capacity or 24 ampoules 2·5 ml capacity
Trapping capacity	60 ml using P_2O_5 desiccant
Pirani gauge	0·5 to 0·001 torr.

FM-370

FREEZE DRYING APPARATUS, *Edwards* **Model EF03, standard model,** as specification, for use with chemical desiccant and including motor-driven spinner, rotary vacuum pump, Pirani vacuum gauge and one secondary drying/sealing manifold. For 220/240V 50 Hz single phase supplies. Power max. 750W. Each **£395·00** *f*

ACCESSORIES

FM-374 **Secondary drying/sealing manifold.** Must be used when the maximum capacity of 96×0·5 ml ampoules requires secondary drying and sealing ... Each **£36·00** *f*

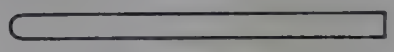
FM-376 **Deep-cooled condenser** to replace desiccant trays. Uses solid CO_2 or liquid nitrogen. Increases the trapping capacity to 400 ml... ... ... Each **£10·00** *f*

REFRIGERATED VERSION

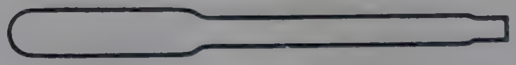
A floor standing cabinet, containing a refrigeration system, has the Standard Version mounted upon it, with the refrigerator condenser coil fitted in the freeze drier trap body. Operating temperature is about −45°C and the trapping capacity is up to 1 litre. Suitable for container use and where chemical desiccants and freezing mixtures are inconvenient.

FM-380

FREEZE DRYING APPARATUS, *Edwards* **Model EF03, refrigerated model,** as specification, including standard model with secondary drying sealing manifold, refrigerator cabinet, temperature indicator and manifold/tube coupling attachment. For 220/240V 50 Hz single phase supplies. Power max. 1 kW ... Each **£646·00** *f*



FM-520



FM-522
FM-524

FREEZE DRYING AMPOULES TO BS 795

In clear neutral glass BP quality. The top 11 mm of the open ends are accurately dimensioned (internal neck diameter 5·9—6·1 mm) and glazed.

List No.	BS type	Nominal capacity ml	Nominal length mm	Carton quantity	Carton	
					£	
FM-520	L/05	0·5	100	525	**4·20**	cS
FM-522	K/205	2·5	154	368	**7·50**	cS
FM-524	K/10	10·0	158	176	**5·00**	cS

Items on this page coded S normally available from stock.

SINTAGLASS FILTER FUNNELS

Manufactured in our own factory under accurately controlled conditions.

- **Close tolerance porosity ranges**
- **Non-friable sintered plates**
- **Colour coded for porosity**
- **Made from borosilicate glass**

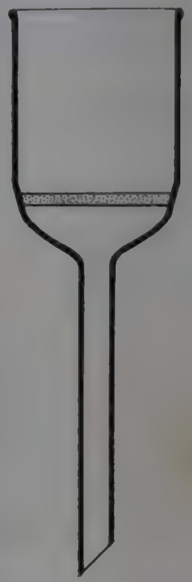
For additional technical information see data under page heading Sintered Glassware

POROSITIES AND APPLICATIONS

Porosity	Code colour	BS 1752 specified range of maximum pore dia.	Sintaglass range of maximum pore dia.	Principal uses
		μm	μm	
0	White	150 – 250	**200 – 250**	Coarse distribution of gas in liquids.
1	Yellow	90 – 150	**100 – 120**	Filtration of very coarse precipitates. Support for absorptive layers for filtering gelatinous precipitates. Gas distribution in liquids. Extraction of coarse grain material.
2	Green	40 – 90	**40 – 50**	Preparative work with crystalline precipitates. Medium gas filtration. Mercury filtration. Extraction of medium grain material.
3	Black	15 – 40	**20 – 30**	Preparative work with fine precipitates. Analytical work with medium precipitates. Fine gas filtration. Mercury filtration. Extraction of fine grain material.
4	Orange	5 – 15	**5 – 10**	Analytical work with very fine precipitates ($BaSO_4$, Cu_2O). Preparative work with finest precipitates. Safety valves for mercury.
†5	Blue	Not greater than 2	**1 – 1·8**	Bacteriological filtration.

† See Note on Bacteriological Filters under page heading Sintered Glassware.

SINTAGLASS FILTER FUNNELS



FM-601 to FM-624

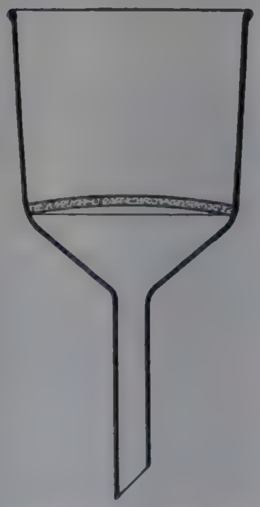
FUNNELS, *SintAglass*, **cylindrical,** with **flat** sintered glass plate.

Capacity, approx.	30	60	120 ml	
Plate diameter	30	40	40 mm	
Porosity		List Numbers		
1	**FM-601**	**FM-611**	**FM-621**	
2	**FM-602**	**FM-612**	**FM-622**	
3	**FM-603**	**FM-613**	**FM-623**	
4	**FM-604**	**FM-614**	**FM-624**	
Ten	**£6·60**	**7·20**	**7·80**	a
Each	**£0·74**	**0·80**	**0·88**	
Porosity				
5	**FM-605**	**FM-615**	—	
Ten	**£13·80**	**15·00**	—	a
Each	**£ 1·55**	**1·70**	—	

FILTER PUMPS, water jet and electrically operated see FD-210 to FD-250 in List No. sequence.

FUNNELS, *SintAglass*, **Buchner,** with **domed** sintered glass plate.

Capacity approx	140	400	700	2500 ml	
Plate diameter	65	90	120	175 mm	
Porosity		List Numbers			
0	—	**FM-640**	**FM-650**	**FM-660**	
1	**FM-631**	**FM-641**	**FM-651**	**FM-661**	
2	**FM-632**	**FM-642**	**FM-652**	**FM-662**	
3	**FM-633**	**FM-643**	**FM-653**	**FM-663**	
4	**FM-634**	**FM-644**	**FM-654**	**FM-664**	
Ten	**£13·00**	**17·50**	**26·00**	—	a
Each	**£ 1·45**	**1·95**	**2·90**	**7·20**	
Porosity					
5	**FM-635**	—	—	—	
Ten	**£22·00**	—	—	—	a
Each	**£ 2·40**	—	—	—	



FM-631 to FM-664

FILTER FLASKS suitable for use with these funnels see FJ-280 in List No. sequence.

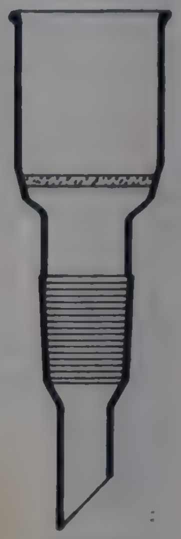
RUBBER FLASK ADAPTER suitable for use with these funnels see CW-722 in List No. sequence.

All items on this page normally available from stock.

SINTAGLASS FILTER FUNNELS

FUNNELS, *Sintaglass*, **cylindrical** with **flat** sintered glass plate and 24/29 cone on stem. Plate diameter 40 mm, capacity approx. 60 ml.

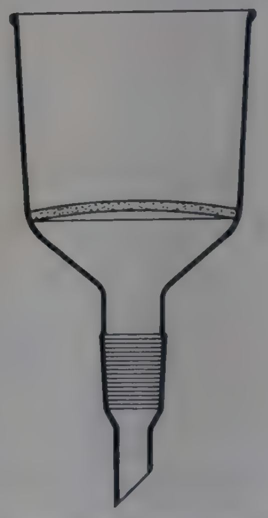
FM-703	Porosity 3	Ten	**£12·20**	Each	**£1·35**	*a*
FM-704	Porosity 4	Ten	**£12·20**	Each	**£1·35**	*a*



FM-703
FM-704

FUNNELS, *Sintaglass*, **Buchner,** with **domed** sintered glass plate and 24/29 cone on stem.

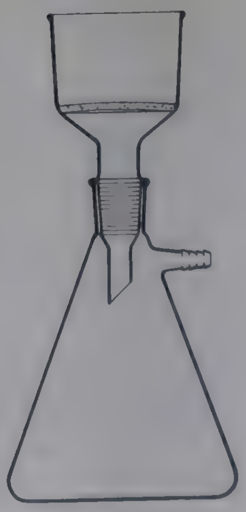
Capacity approx.	140	400	700	2500 ml	
Plate diameter	65	90	120	175 mm	
Porosity	List Numbers				
3	**FM-713**	**FM-723**	**FM-733**	**FM-743**	
4	**FM-714**	**FM-724**	**FM-734**	**FM-744**	
Ten	**£20·50**	**26·00**	**35·00**	—	*a*
Each	**£ 2·30**	**2·90**	**3·90**	**8·15**	
Porosity					
5	**FM-715**	—	—	—	
Ten	**£30·00**	—	—	—	*a*
Each	**£ 3·40**	—	—	—	



FM-713 to FM-794

FUNNELS, *Sintaglass*, **Buchner,** with **domed** sintered glass plate and 29/32 cone on stem.

Capacity approx.	140	400	700 ml	
Plate diameter	65	90	120 mm	
Porosity	List Numbers			
3	**FM-773**	**FM-783**	**FM-793**	
4	**FM-774**	**FM-784**	**FM-794**	
Ten	**£20·50**	**26·00**	**35·00**	*a*
Each	**£ 2·30**	**2·90**	**3·90**	
Porosity				
5	**FM-775**	—	—	
Ten	**£30·00**	—	—	*a*
Each	**£ 3·40**	—	—	



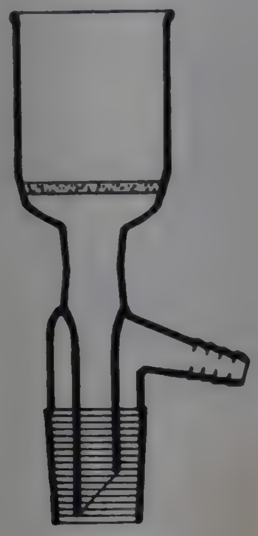
FM-713 with Q-FBIL/3

FILTER FLASKS for use with these funnels;

24/29 socket	see QFB250/3 et seq. in the Quickfit Section.
29/32 socket	see FJ-290 in List No. sequence.

All items on this page normally available from stock.

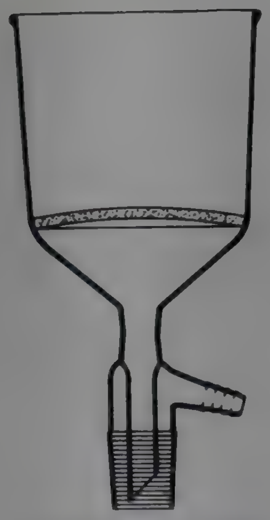
SINTAGLASS FILTER FUNNELS



FM-833
FM-834

FUNNELS, *SintAGlass*, **cylindrical,** with **flat** sintered glass plate, 24/29 cone on stem and side tube for connection to a filter pump. Plate diameter 40 mm, capacity approx. 60 ml.

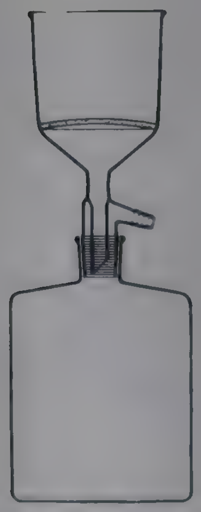
FM-833	Porosity 3	Ten	**£15·50**	Each	**£1·75**	*a*
FM-834	Porosity 4	Ten	**£15·50**	Each	**£1·75**	*a*



FM-843 to FM-894

FUNNELS, *SintAGlass*, **Buchner,** with **domed** sintered glass plate, side tube for connection to a filter pump and 24/29 cone on stem.

Capacity approx.	140	400 ml	
Plate diameter	65	90 mm	
Porosity	List Numbers		
3	**FM-843**	**FM-853**	
4	**FM-844**	**FM-854**	
Ten	**£22·00**	**30·00**	*a*
Each	**£ 2·45**	**3·40**	
Porosity 5	**FM-845**	—	
Ten	**£32·00**	—	*a*
Each	**£ 3·60**	—	



FM-843 with BW-655

FUNNELS, *SintAGlass*, **Buchner,** with **domed** sintered glass plate, side tube for connection to a filter pump and 29/32 cone on stem.

Capacity approx.	140	400 ml	
Plate diameter	65	90 mm	
Porosity	List Numbers		
3	**FM-883**	**FM-893**	
4	**FM-884**	**FM-894**	
Ten	**£22·00**	**30·00**	*a*
Each	**£ 2·45**	**3·40**	
Porosity 5	**FM-885**	—	
Ten	**£32·00**	—	*a*
Each	**£ 3·60**	—	

RESERVOIR BOTTLES suitable for use with these funnels see BW-655 in List No. sequence.

All items on this page normally available from stock.

SINTAGLASS FILTER FUNNELS

FUNNELS, *Sintaglass,* **Hirsch,** with **flat** sintered glass plate.

Capacity approx.	25	60 ml	
Plate diameter	20	30 mm	
Top diameter	55	80 mm	
Porosity	List Numbers		
3	**FM-923**	**FM-933**	
4	**FM-924**	**FM-934**	
Ten	**£6·60**	**7·80**	*a*
Each	**£0·74**	**0·88**	

FUNNELS, *Sintaglass,* **Hirsch,** with **flat** sintered glass plate 20 mm diameter and 19/26 cone on stem. Capacity approx. 20 ml.

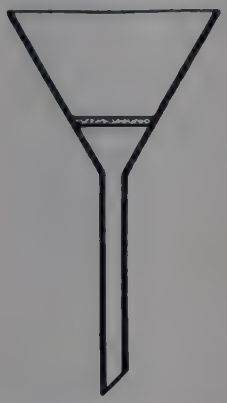
FM-963	Porosity 3	Ten	**£12·20**	Each	**£1·35**	*a*
FM-964	Porosity 4	Ten	**£12·20**	Each	**£1·35**	*a*

TF-410

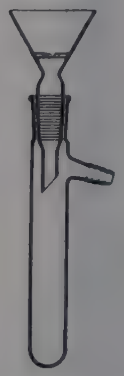
TEST TUBE, with 19/26 socket and side tube, see entry in List No. sequence.

FD-603

FUNNEL, *Sintaglass,* **Hirsch semi-micro,** with 10 mm sintered glass plate, porosity 3, and 14/15 cone on stem. For price see entry in List No. sequence.



FM-923 to FM-934



FM-963 with TF-410

GLASS FUNNELS

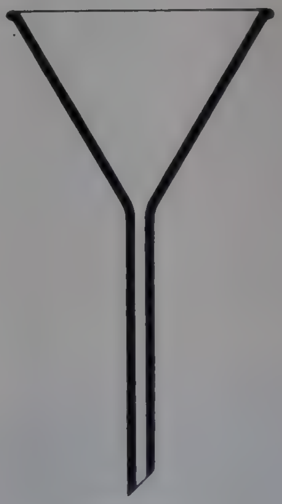
FP-240

FUNNELS, soda glass, plain pattern, to BS 1923 (see table below).

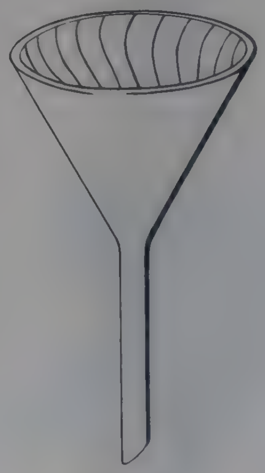
FP-245

FUNNELS, as FP-240 but ribbed (see table below).

List No.	**FP-240**		**FP-245**		
Size, cm	25 £	Each £	25 £	Each £	
5	4·10	0·24	4·10	0·24	c
7·5	4·60	0·26	4·60	0·26	c
	Ten £	Each £	Ten £	Each £	
10	2·40	0·30	2·40	0·30	c
15	3·90	0·44	3·90	0·44	c
20	6·20	0·68	6·20	0·68	c
25	10·80	1·20	10·80	1·20	c
30	13·40	1·50	13·40	1·50	c



FP-240
FP-270

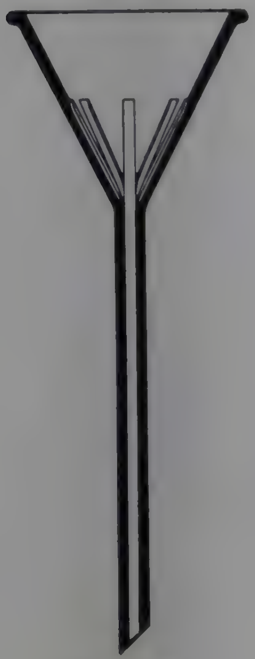


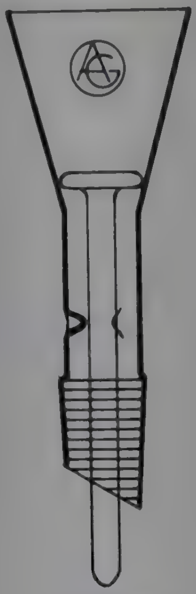
FP-245

FUNNEL STANDS see **SM-210** to **SM-244** in List No. sequence.

All items on this page normally available from stock.

GLASS FUNNELS (Cont'd)


FP-280


FP-290

FP-270

FUNNELS, *Pyrex brand* glass, to BS 1923. Length of stem is same as the top diameter of funnel.

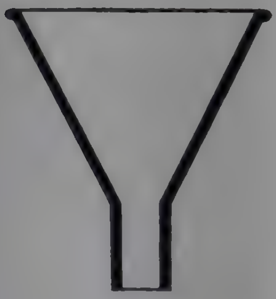
Diameter	5	6·2	7·5	8·7 cm	
Std. pack qty.	24	24	24	24	
Std. pack	**£6·45**	**6·75**	**7·50**	**8·00**	*d*
Each	**£0·34**	**0·35**	**0·38**	**0·40**	

Diameter	10	15	20 cm	
Std. pack qty.	24	12	6	
Std. pack	**£8·90**	**7·80**	**4·90**	*d*
Each	**£0·44**	**0·74**	**0·90**	

FP-280

FUNNELS, *Pyrex brand* glass, to BS 1923, precision pressed, with long stem and fluted internally for quick filtering.

Diameter	6·2	7·5	10 cm	
Std. pack qty.	24	24	24	
Std. pack	**£7·50**	**7·80**	**10·10**	*d*
Each	**£0·38**	**0·40**	**0·49**	


FP-300

FP-290

FUNNEL, Willstätter filter, AG, with glass nail to support filter paper disks of approximately 15 mm diameter. Nominal capacity 5 ml, overall length with nail 100 mm, fitted with 14/15 drip end cone joint, borosilicate glass... ... ... Ten **£9·00** Each **£1·00** *a*

FP-300

FUNNEL, *Pyrex brand* glass, with short stem for powders. Top diameter, 7·5 cm.
Std. pack of 12 **£4·75** Each **£0·45** *d*

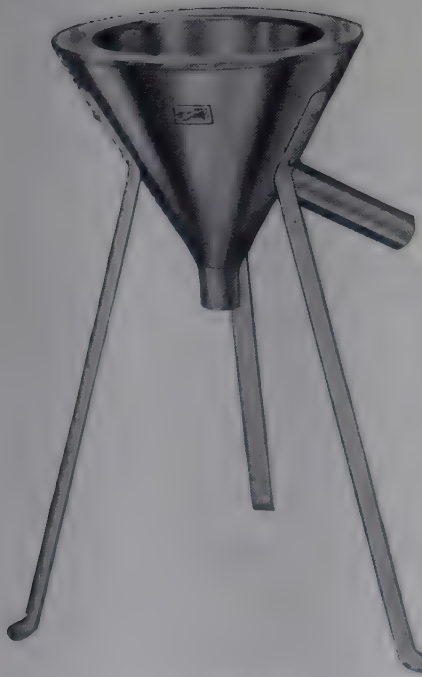
FUNNEL HEATERS

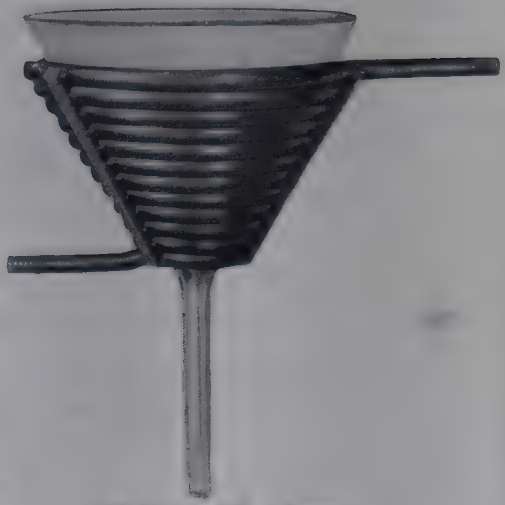
FP-310

FUNNEL HEATER, hot water, double wall copper supported on three legs. To take, but not supplied with, 15 cm diameter glass funnel ... ... Each **£8·50** c

FP-314

FUNNEL HEATER, steam, constructed from lead tubing. To take, but not supplied with, 15 cm diameter glass funnel ... ... Each **£6·25** c


FP-310


FP-314 with 15 cm glass funnel

FUNNEL heaters, *Electrothermal* see HEATING MANTLES
FUNNEL holders } see STANDS & CLAMPS
FUNNEL stands }
FUNNELS, weighing see WEIGHING ACCESSORIES

All items on this page normally available from stock.

PLASTICS FUNNELS

FP-322

FUNNELS, polypropylene, with external ribs to avoid airlocks.

Diameter	4	6·3	9	11·5 cm	
Ten	£0·40	0·50	0·78	1·40	c
Each	£0·13	0·13	0·15	0·21	

Diameter	14	16·5	19 cm	
Ten	£1·85	2·15	3·40	c
Each	£0·25	0·28	0·40	

STAINLESS STEEL FUNNELS

FP-370

FUNNELS, stout welded stainless steel, with handle.

Diameter	160	205	255 mm	
Each	£6·50	6·90	9·40	m

FP-322

FP-370

BUCHNER FUNNELS

FP-460

FUNNEL, slit sieve Buchner, *Pyrex brand* glass. With glass disk, of 6 cm diameter, sealed-in above the stem.
Std. pack of 4 **£4·95** Each **£1·20** *d*

***FP-470**

FUNNELS, Buchner, rigid polythene, made in two pieces to allow ease of cleaning.

Paper diameter	7	9	11	15	24 cm	
Depth	4	4·5	6	8·5	11·5 cm	
Each	£0·67	1·17	1·77	2·90	6·25	m

FP-495

FUNNELS, Buchner, *Royal Worcester* porcelain, with perforated plate.

Ext. dia.	65	82	105	125 mm	
For papers dia.	55	70	90	110 mm	
Each	£0·67	0·93	1·25	1·65	d

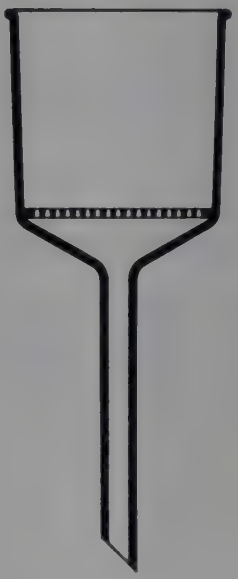
Ext. dia.	168	220	275 mm	
For papers dia.	150	185	240 mm	
Each	£3·50	4·40	9·50	d

FP-510

FUNNELS, Buchner, Hartley 3-section pattern, *Royal Worcester* porcelain. Size of suitable filter paper same as relevant disk diameter.

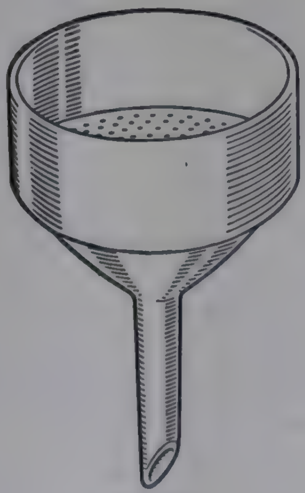
Size No.	2	3	4	5	6	
Disk dia.	90	110	125	150	185 mm	
Each	£1·80	2·50	2·90	3·70	4·50	d

BUCHNER TYPE FILTERS in polypropylene and stainless steel see also page 250.

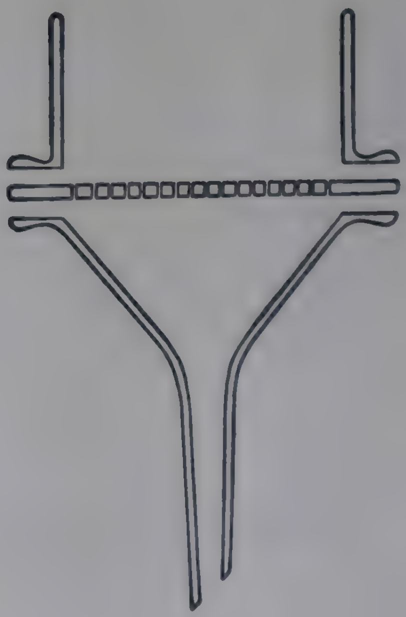


FP-460

FP-470
(shown in two pieces)



FP-495



FP-510

All items on this page normally available from stock.

SEPARATING FUNNELS
SPHERICAL OR PEAR SHAPE

FP-541

FUNNELS, spherical, separating, (AG) to BS 2021 Type 1A with interchangeable polypropylene stopper, borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Joint size	19/17	19/17	24/20	24/20	29/22	
Ten	**£8·00**	**9·20**	**11·00**	**14·00**	**18·50**	*a*
Each	**£0·90**	**1·02**	**1·25**	**1·55**	**2·05**	

FP-543

FUNNELS, spherical, separating, (AG) as FP-541 but fitted with **interchangeable stopcock,** borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Ten	**£11·00**	**12·00**	**14·00**	**17·50**	**21·00**	*a*
Each	**£ 1·25**	**1·35**	**1·55**	**1·95**	**2·35**	

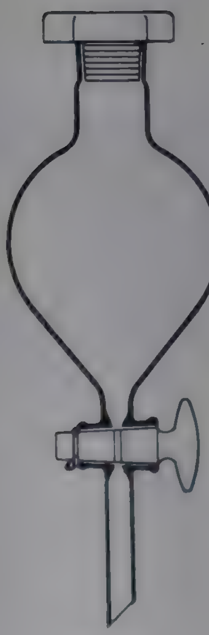
ACCESSORIES

SU-520	**STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.

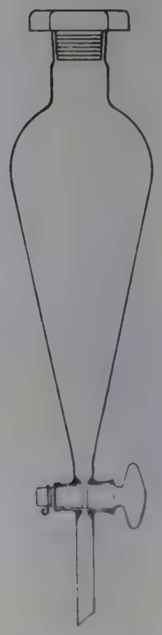
FP-546

FUNNELS, spherical, separating, (AG) as FP-541 but fitted with **ptfe stopcock.**

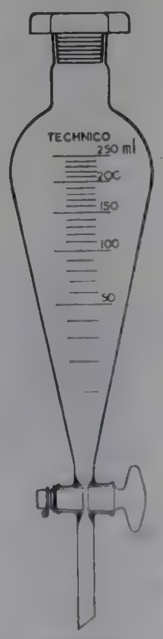
Capacity	50	100	250	500	1000 ml	
Ten	**£14·00**	**15·50**	**17·50**	**20·00**	**24·50**	*a*
Each	**£ 1·55**	**1·70**	**1·95**	**2·20**	**2·70**	



FP-541
FP-543



FP-551
FP-553



FP-554

FP-548

FUNNELS, spherical, separating, to BS 2021 Type 1A, *Pyrex brand* glass with interchangeable glass stopper.

Capacity	50	100	250	500 ml	
Joint size	19/26	19/26	24/29	24/29	
Std. pack qty.	6	6	6	6	
Std. pack	**£10·85**	**11·05**	**11·95**	**12·20**	*d*
Each	**£1·95**	**2·00**	**2·15**	**2·20**	

Capacity	1000	2000	5000 ml	
Joint size	29/32	34/35	34/35	
Std. pack qty.	4	2	2	
Std. pack	**£9·45**	**6·05**	**9·25**	*d*
Each	**£2·50**	**3·10**	**4·80**	

SEPARATING FUNNELS
CONICAL SHAPE

FP-551

FUNNELS, conical, separating, (AG) to BS 2021 Type 2A with interchangeable polypropylene stopper, borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Joint size	19/17	19/17	24/20	24/20	29/22	
Ten	**£10·40**	**11·00**	**14·00**	**17·50**	**22·50**	*a*
Each	**£ 1·16**	**1·25**	**1·55**	**1·95**	**2·50**	

FP-553

FUNNELS, conical, separating, (AG) as FP-551 but fitted with **interchangeable stopcock,** borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Ten	**£13·60**	**14·60**	**17·50**	**20·50**	**26·00**	*a*
Each	**£ 1·55**	**1·65**	**1·95**	**2·25**	**2·90**	

ACCESSORIES

SU-520	**STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.

FP-554

FUNNELS, conical, separating, *Technico* as FP-551 but **graduated.**

Capacity	100	250 ml	
Dozen	**£27·00**	**28·00**	*a*
Each	**£ 2·55**	**2·65**	

FP-556

FUNNELS, conical, separating, (AG), as FP-551 but fitted with **ptfe stopcock.**

Capacity	50	100	250	500	1000 ml	
Ten	**£16·50**	**17·00**	**20·00**	**23·00**	**28·00**	*a*
Each	**£ 1·85**	**1·90**	**2·20**	**2·55**	**3·10**	

FP-558

FUNNELS, conical, separating, to BS 2021 Type 2A, *Pyrex brand* glass with interchangeable glass stopper.

Capacity	100	250	500	1000	2000 ml	
Joint size	19/26	24/29	24/29	29/32	34/35	
Std. pack qty.	6	6	6	4	2	
Std. pack	**£9·70**	**10·85**	**11·15**	**8·40**	**5·80**	*d*
Each	**£1·75**	**2·00**	**2·00**	**2·25**	**3·00**	

All items on this page normally available from stock.

DROPPING FUNNELS

CYLINDRICAL SHAPE

FP-570

FUNNELS, cylindrical, dropping, open top, (AG), borosilicate glass.

Capacity	25	50	100	250 ml	
Ten	£6·60	7·00	7·60	10·40	a
Each	£0·74	0·78	0·84	1·16	

NR-220

FUNNEL cylindrical, dropping, with long offset delivery stem, see entry in List No. sequence.

FP-581

FUNNELS, cylindrical, dropping, (AG) to BS 2021 Type 3, with interchangeable polypropylene stopper, borosilicate glass.

Capacity	25	50	100	250	500	1000 ml	
Joint size	14/15	19/17	19/17	24/20	24/20	29/22	
Ten	£8·40	9·20	9·60	10·80	14·00	19·00	a
Each	£0·94	1·02	1·06	1·20	1·55	2·10	

FP-583

FUNNELS, cylindrical, dropping, (AG) to BS 2021 Type 3 with interchangeable polypropylene stopper, borosilicate glass.

Capacity	25	50	100	250	500	1000 ml	
Ten	£11·60	12·00	12·60	14·00	17·50	23·00	a
Each	£1·30	1·35	1·40	1·55	1·95	2·55	

FP-584

FUNNELS, cylindrical, dropping, *Technico*, as FP-581 but **graduated.**

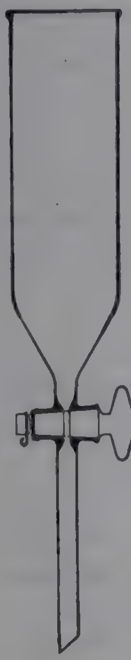
Capacity	50	100	250	500	1000 ml	
Dozen	£16·50	17·00	23·00	27·00	33·00	a
Each	£ 1·55	1·60	2·20	2·55	3·10	

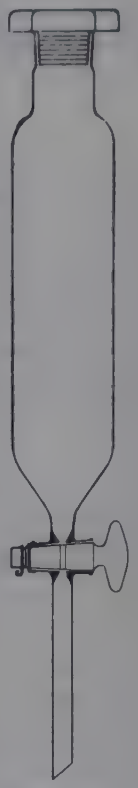
FP-587

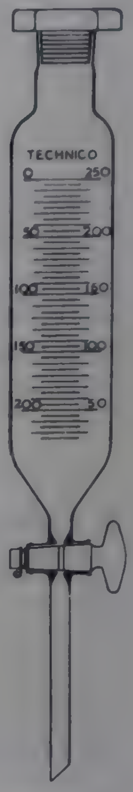
FUNNEL, cylindrical, dropping, (AG) with 14/15 socket and 14/15 drip end cone. Nominal capacity 30 ml, overall length 21 cm, borosilicate glass. Without stopper.
Ten **£17·00** Each **£1·90** a

ACCESSORIES

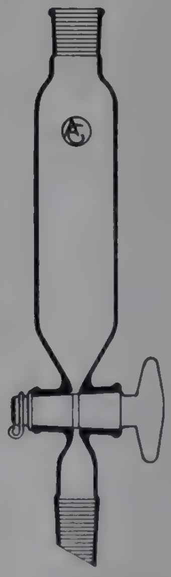
SU-520 **STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.

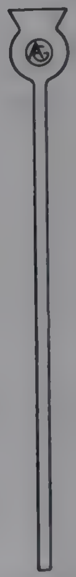

FP-570

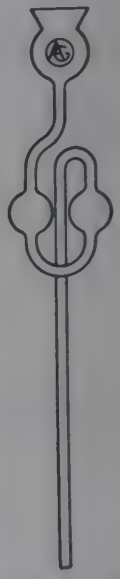

FP-581
FP-583



FP-584


FP-587


FP-650


FP-660

THISTLE FUNNELS

FP-650

FUNNEL, thistle, (AG) soda-lime glass, with straight stem. Overall length 30 cm.
Ten **£1·20** Each **£0·19** a

FP-660

FUNNEL, thistle, (AG) as FP-650 but with bend and two bulbs. Overall length, 30 cm.
Ten **£3·50** Each **£0·41** a

SEPARATING AND DROPPING FUNNELS with standard joint cone on stem see *Quickfit* Section.

All items on this page normally available from stock.

Gallenkamp LABORATORY FURNACES

Gallenkamp furnaces are tested using methods recommended in British Standard BS 4309.

The wide range of furnaces which we offer includes types to suit practically all laboratory applications. The outstanding performance and reliability of each furnace results directly from our design and production experience accumulated since 1914 when we started manufacturing and our use of modern methods and materials.

- Furnaces are designed for safe and reliable operation at the published maximum temperature.
- Furnaces are, whenever practicable, self-contained with all controls and accessories necessary for efficient operation built into non-corroding asbestolite cases.
- All furnaces are robustly constructed and are efficiently thermally insulated.
- Temperature fuses and other safety devices are fitted where stated to prevent damage by accidental overheating.

FURNACE SECTION INDEX

List No.	Description	Maximum temperature	Internal dimensions	Controls	Page
FR-510	Muffle furnace, wire wound	1100°C	10 × 12·5 × 15 cm	Manual	277
FR-600/614	Muffle furnaces, wire wound	1100°C	8 × 15 × 23·5 cm 13·5 × 19 × 38 cm 20 × 23 × 46 cm	Manual or automatic	278
FR-655/657	Box furnace, wire wound	1250°C	15 × 15 × 30 cm	Automatic	280
FR-720/721	Box furnace, silicon carbide elements	1400°C	10 × 12·5 × 18 cm	Manual	281
FR-740/741	Box furnaces, silicon carbide elements	1400°C	10 × 15 × 30 cm 15 × 23 × 38 cm	Automatic	282
FR-770	Box furnace, molybdenum disilicide elements	1500°C	18 × 18 × 32 cm	Automatic	283
FS-212/215	Tube furnace, wire wound	1200°C	30 × 3·8 cm	Manual	284
FS-300	Tube furnace, silicon carbide elements	1400°C	15 × 3 cm	Manual	285
FS-400	Tube furnaces, molybdenum disilicide elements	1500°C	27 × 3·9 cm 32 × 8 cm	Automatic	286
FS-900	Carius furnace	300°C	7 × 3 cm	Manual	287

Gallenkamp LABORATORY FURNACES

TECHNICAL INFORMATION

HEATING ELEMENTS

Wire-wound heating elements

Wire-wound muffle and tube furnaces and box furnaces with internal spiralled wire elements, utilise high quality resistance wires. Suitable materials for these wires were selected only after extensive life tests and many years of experience have confirmed the designs of the elements.

Silicon carbide heating elements

Silicon carbide elements are capable of attaining high temperatures without the need for a protective atmosphere. They are made in the form of a tube of uniform diameter, the centre having a helical slot to form a higher resistance heating zone.

The increase of electrical resistance at 1400 to 1450°C is about 15 to 20% in 1000 hours. This low ageing rate together with efficient furnace design enables furnaces which use these elements to be used reliably at temperatures up to 1400°C. All designs permit quick and easy replacement of elements when necessary.

Some models are offered with built-in **element economiser transformers** which can be adjusted to increase the voltage on the heating elements as they age. For an initial extra cost less than that of a set of replacement elements, the useful life of each set of elements may be substantially increased.

Molybdenum disilicide heating elements

These elements are of molybdenum disilicide, modified by the addition of metallic and ceramic materials to provide a highly refractory material ideally suited for furnace heating elements. They can be heated to 1600°C in air for extended periods with little increase in electrical resistance. This high operating temperature enables furnaces to be constructed having a good heating rate and capable of operation up to 1500°C with minimum element deterioration. Molybdenum disilicide elements are unsuitable for routine operation below 1000°C. Box and tube furnaces fitted with molybdenum disilicide elements have established an excellent reputation for reliability at high temperatures.

Owing to the low resistivity of molybdenum disilicide and to the fact that heating elements of this material are manufactured with a relatively large cross-section, these elements must be operated on low voltage/high current supplies from tapped transformers. These transformers are supplied as standard equipment with all *Gallenkamp* molybdenum disilicide element furnaces.

CONSTRUCTION

All furnace outer cases are constructed from non-corroding asbestolite panels with smooth surfaces. Highest grade refractory and insulating materials are used throughout. Doors are light alloy castings, efficiently insulated and accurately counterpoised or mounted for easy movement between stable open and closed positions. The refractory linings of doors on larger furnaces do not radiate towards the operator; they are prevented from doing so by the positions and designs of the suspension systems. Exterior fittings such as hearth-shelves are strong alloy castings. On furnaces operating up to 1100°C, thermocouples are chromel-alumel and for higher temperatures they are platinum—13% rhodium platinum.

TEMPERATURE CONTROL

With few exceptions three alternative types of temperature control circuits are offered for the range of furnaces. To ensure that control methods, circuits and safety equipment on furnaces are the most modern and satisfactory at reasonable cost, regular exhaustive tests are made on new equipment which becomes available.

1. **Manual control** (by energy regulator).

This is the least expensive method of control, and although very simple, it provides a remarkable performance over long periods. For example the total temperature drift can be as small as ±5degC over 24 hours. An energy regulator approximately compensates for moderate fluctuations in mains voltage, and is quite adequate for many laboratory applications. The operating setting is found by trial and error, and temperature stabilisation and recovery are slow (unless the regulator is adjusted) and a temperature drift results from significant changes in ambient temperature such as may be caused by draughts.

2. **Automatic ON/OFF control** (by ON/OFF controller and energy regulator).

Using this type of control, the disadvantages of manual control are largely overcome. The working temperature rises rapidly to the value set on the calibrated scale, recovery after loading the furnace is brisk and accurate, and the effects of ambient temperature changes are negligible. Temperature fluctuations due to the cycling of the controller are minimised by use of the energy regulator.

These considerations, and the ease with which the temperature may be set, frequently justify the additional cost of automatic on/off control.

See **Note** below.

3. **Automatic proportional control** (by proportional controller and where necessary energy regulator).

This type of control is the most accurate standard form of control fitted to *Gallenkamp* furnaces.

The pointer has merely to be set on the scale, and the controller takes over completely. As with the simpler on/off control, the furnace recovers briskly and is independent of ambient temperature and supply voltage fluctuations. With automatic proportional control, however, the mean energy input is gradually reduced as the required temperature is approached, thus eliminating temperature overshoot and fluctuations. It is strongly recommended wherever stringent temperature control is essential. An energy regulator is, in certain furnaces, retained to permit control of heating and cooling rates when this also is desirable.

NOTE: All automatic controllers fail safe and have thermocouple breakage protection devices to switch off the furnace in the event of a break in the thermocouple circuit.

FURNACE APPLICATIONS

MUFFLE FURNACES
used in

Fuel Testing
Food Science
Metallurgy
Chemistry
Glass Manufacture

Paint Technology
Medicine

Dentistry
Mineralogy
Ceramics Production
General Industrial Applications

for

Metal melting
Alloying
Tempering and hardening of tools
Precipitate drying and ignition
Assaying

Inorganics in paints and resins
Heat treatment of metals
Fusions
Annealing of glass and metals

Sintering
Decoration and glazing of ceramics
Ash determination
Incineration and ignition

BOX FURNACES
used in

Chemistry
Cement Testing

Glass Manufacture
Fuel Testing

Metallurgy
Ceramics Production

for

Enamelling
Annealing prior to hot forming or drawing

Ceramic firing
Fusions
Tempering
Glass melting

Case hardening of steels
Silica in cement
Heat treating tools and piece parts

TUBE FURNACES
used in

Cement Testing
Fertiliser Industry

Metallurgy
Ceramics Production
Chemistry

Organic Analysis
Fuel Testing

for

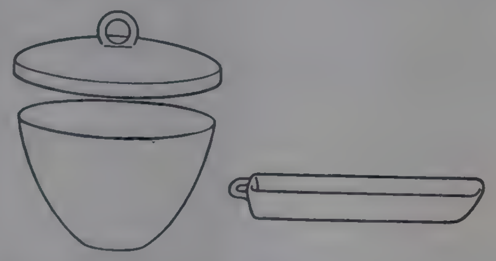
Carbon and sulphur in steels
Fusion of coal ash
Tempering

Elemental analyses of organic substances
Heat treatments of metals in controlled atmospheres

General combustion analyses
Hydrogen, chlorine, sulphur, nitrogen in compounds

ACCESSORIES FOR SAMPLE HANDLING

- To contain particulate samples in muffle and tube furnaces.

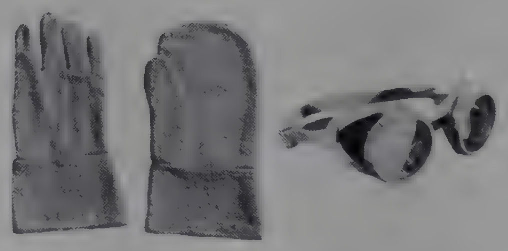


See page headings Boats and Crucibles

- For large samples and piece parts in muffle furnaces.

See page headings Tongs and Trays

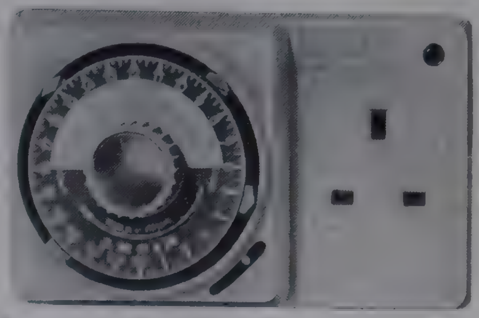
- For operator protection.



See page heading Clothing, Protective

ACCESSORIES FOR FURNACE OPERATION

- For remotely switching furnace supplies ON or OFF.



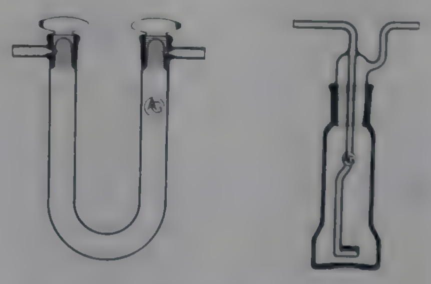
See page heading Time Switches

- For temperature measurement and control.

°C
Gallenkamp

See page heading Pyrometry

- For gas scrubbing and absorption.



See page headings Absorption and Gas Washbottles

All items on this page normally available from stock.

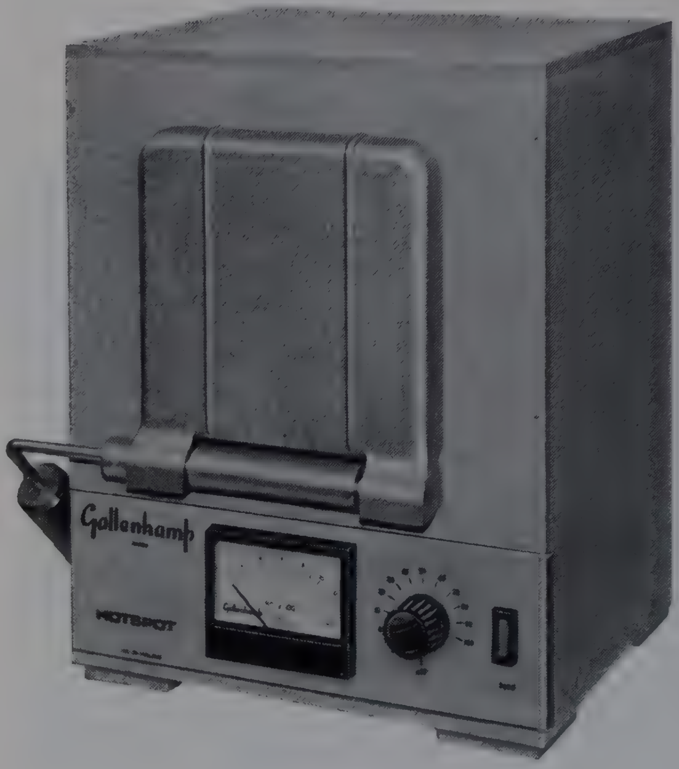
Gallenkamp 'HOTSPOT' MUFFLE FURNACE, 1000°C or 1100°C

WOUND WIRE HEATING ELEMENTS
MANUAL CONTROL

A compact bench furnace for general laboratory purposes.

- **Heating to 1000°C in under one hour**
  - **Fluctuation less than 3degC**
    - **Built-in automatic cold junction temperature compensation**
      - **Cast muffle provides smooth interior**

This furnace may be operated at temperatures up to 1000°C or for limited periods between 1000°C and 1100°C. A 1000°C thermal fuse to protect the heating element is supplied fitted to every furnace; for working up to 1100°C this must be replaced by the accessory fuse FR-535.



FR-510

DIMENSIONS

	H	W	D
Internal	10 ×	12·5 ×	15 cm
	4 ×	5 ×	6 in
Overall	39 ×	35 ×	30 cm
	15½ ×	14 ×	12 in
Base		30·5 ×	24·5 cm
		12¼ ×	9¾ in
Weight, net	23 kg (50 lb)		
Maximum power rating	1500W		

For additional technical information refer to pages 274 to 276.

FR-510

MUFFLE FURNACE, 'HOTSPOT', *Gallenkamp*, **manual control, for 1000°C** with energy regulator, 5·7 cm scale indicating pyrometer and element protection fuse. For single phase a.c. supplies.

For 220/240V	Each	**£82·00**	*b*
For 200/210V	Each	**£84·00**	*bN*
For 110/120V	Each	**£84·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FR-522	**Wound muffle**		Each	**£7·50**	*b*
FR-527	**Temperature fuse, 1000°C,** assembly comprising fuse wire, insulators and terminations.	Five **£5·30**	Each	**£1·14**	*b*
FR-531	**Outer protecting sheath,** for temperature fuse.		Pack of 3	**£2·10**	*b*
FR-532	**Thermocouple element,** with insulators.		Each	**£1·10**	*b*

ACCESSORY

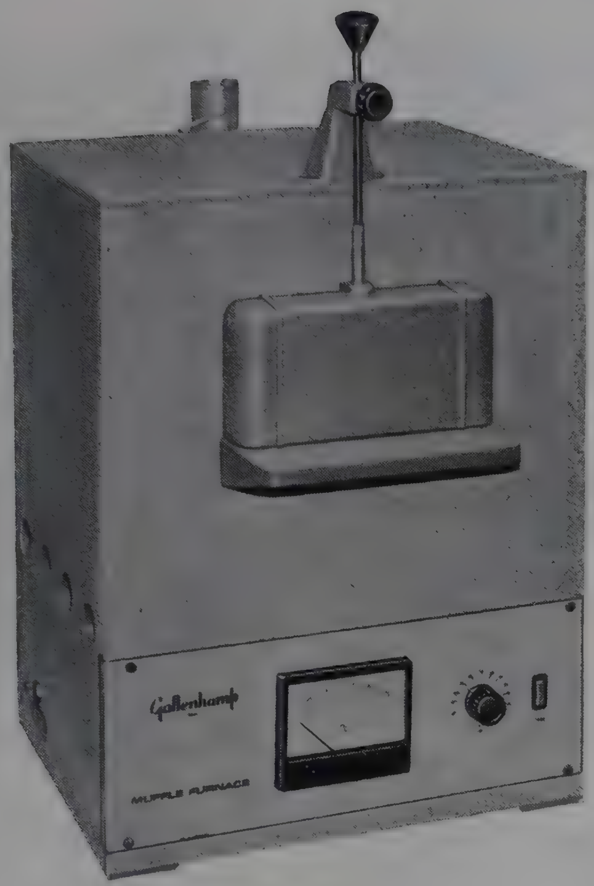
FR-535	**Temperature fuse, 1100°C,** assembly comprising fuse wire, insulators and terminations.	Five **£12·60**	Each	**£2·70**	*b*

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

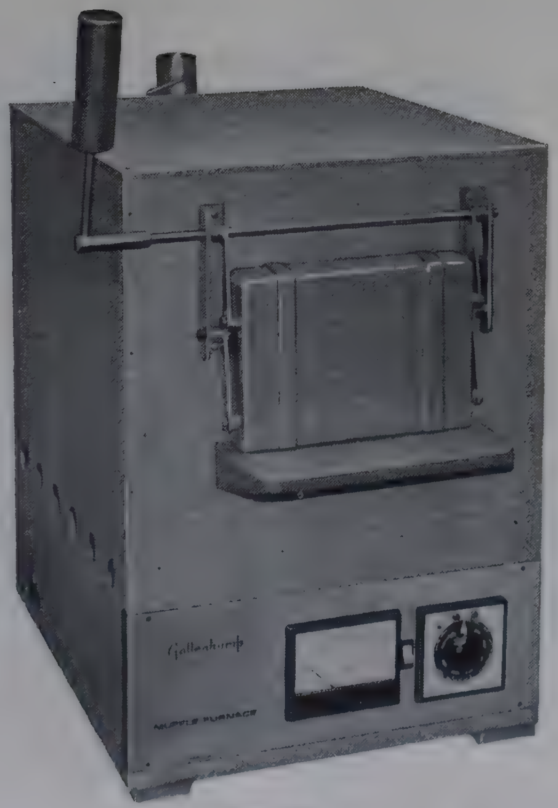
FR-510 showing door open

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL PURPOSE



FR-600



FR-612

A range of muffle furnaces in three sizes with three alternative forms of control suitable for laboratory or tool room use. These furnaces may be operated at temperatures up to 1000°C or for limited periods between 1000°C and 1100°C when fitted with accessory fuse supplied.

- **Heating to 1000°C in 1½ hours**
- **±2degC control with proportional controller**
- **Draught control chimneys fitted at rear**
- **Thermal fuses easily replaced**

Fuses
To avoid damage by overheating to the heater windings or work-pieces, every furnace is fitted with a 1000°C fuse. For operation to 1100°C this must be replaced with the interchangeable accessory fuse FR-624, which is supplied with every furnace. Factory assembled replacement fuses require only inserting and connecting.

Doors
All three sizes are offered with swing-up doors and the two smaller sizes can be supplied with the alternative slide-and-lock doors which are recommended if the furnaces are to be used for ashing or similar work requiring large airflows. All doors open with hot surfaces away from the operator.

For additional technical information refer to pages 274 to 276.

FURNACES WITH SLIDE-AND-LOCK DOORS

FR-600
MUFFLE FURNACES, *Gallenkamp,* **manual control, for 1000°C/1100°C,** with slide-and-lock door, 9 cm scale pyrometer indicator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£117·00**	**148·00**	*b*
For 200/210V	Each	**£119·00**	**150·00**	*bN*
For 110/120V	Each	**£119·00**	**150·00**	*bN*

FR-602
MUFFLE FURNACES, *Gallenkamp,* **automatic proportional control, for 1000°C/1100°C,** with slide-and-lock door, solid state controller calibrated in °C, separate push switch operated 9 cm scale pyrometer for occasional reading of furnace temperature, power relay and element protection fuses. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£143·00**	**171·00**	*g*
For 200/210V	Each	**£145·00**	**173·00**	*gN*
For 110/120V	Each	**£145·00**	**173·00**	*gN*

FR-604
MUFFLE FURNACES, *Gallenkamp,* **automatic indicating proportional control, for 1000°C/1100°C,** with slide-and-lock door, solid state 13 cm scale combined indicator/controller calibrated in °C which provides continuous indication of furnace temperature, power relay and element protection fuses. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£191·00**	**216·00**	*g*
For 200/210V	Each	**£193·00**	**218·00**	*gN*
For 110/120V	Each	**£193·00**	**218·00**	*gN*

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

MUFFLE FURNACES, 1000°C/1100°C

WOUND WIRE HEATING ELEMENTS
MANUAL OR AUTOMATIC CONTROL

DIMENSIONS

Size No.	1	2	3	
	H W D	H W D	H W D	
Internal	8·3 × 15 × 23·5	13·5 × 19 × 38	20 × 23 × 46	cm
	3¼ × 6 × 9¼	5¼ × 7¼ × 15	8 × 9 × 18	in
Overall	76 × 51 × 50	84 × 51 × 67	100 × 65 × 79	cm
	30 × 20 × 19¾	33 × 20 × 26½	39 × 25½ × 31	in
Base	44·5 × 33·5	44·5 × 49	48·5 × 57·5	cm
	17½ × 13¼	17½ × 19¼	19 × 22½	in
Weight, net	50	80	125	kg
	110	175	275	lb
Maximum power rating	2	3·5	5	kW

For suitable TRAYS—see TU-540 in List No. sequence.

FR-614

FURNACES WITH SWING-UP DOORS

FR-610

MUFFLE FURNACES, *Gallenkamp,* **manual control, for 1000°C/1100°C,** with swing-up door, 9 cm scale pyrometer indicator, power relay and element protection fuses. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£122·00	153·00	203·00	*b*
For 200/210V	£124·00	155·00	205·00	*bN*
For 110/120V	£124·00	155·00	205·00	*bN*

All prices each

FR-612

MUFFLE FURNACES, *Gallenkamp,* **automatic proportional control, for 1000°C/1100°C,** with swing-up door, solid state controller calibrated in °C, separate push switch operated 9 cm scale pyrometer for occasional reading of furnace temperature, power relay and element protection fuses. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£148·00	176·00	220·00	*g*
For 200/210V	£150·00	178·00	222·00	*gN*
For 110/120V	£150·00	178·00	222·00	*gN*

All prices each

FR-614

MUFFLE FURNACES, *Gallenkamp,* **automatic indicating proportional control, for 1000°C/1100°C,** with swing-up door, solid state 13 cm scale combined indicator/controller calibrated in °C which provides continuous indication of furnace temperature, power relay and element protection fuses. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£196·00	221·00	265·00	*g*
For 200/210V	£198·00	223·00	267·00	*gN*
For 110/120V	£198·00	223·00	267·00	*gN*

All prices each

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FR-620 **Wound muffles.**

Size No.	1	2	3	
Each	£9·25	17·50	26·00	*b*

FR-622 **Temperature fuse, 1000°C,** assembly comprising fuse wire, insulators and terminations.

For furnace Size No.	1	2 and 3	
Five	£5·30	6·00	*b*
Each	£1·14	1·30	

FR-624 **Temperature fuse, 1100°C,** assembly comprising fuse wire, insulators and terminations.

For furnace Size No.	1	2 and 3	
Five	£13·60	14·00	*b*
Each	£ 2·95	3·00	

FR-626 **Thermocouple element, with insulators.** Each £1·15 *b*

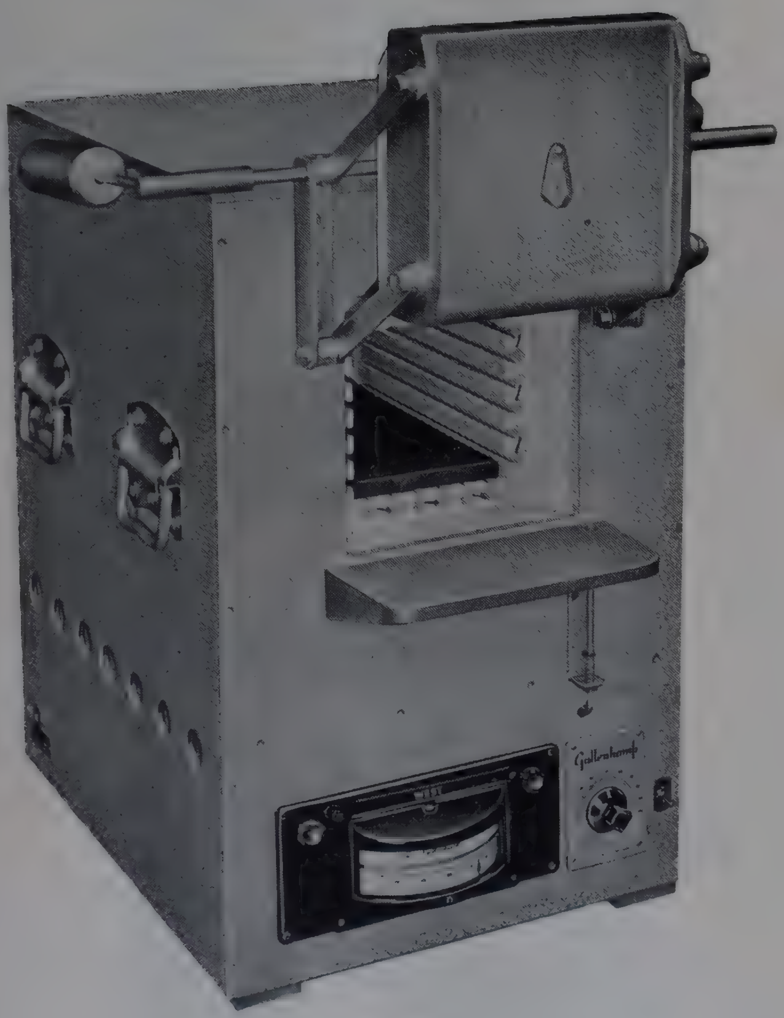
FR-531 **Outer protecting sheath,** for temperature fuse. For price see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL PURPOSE BOX FURNACES, 1250°C

WOUND WIRE HEATING ELEMENTS
AUTOMATIC CONTROL

- **Heating to 1250°C in 2¼ hours**
- **Positively counterpoised doors**
- **Easily replaced heater spirals**
- **Reliable operation at maximum temperature**



FR-655

Suitable for general applications in laboratories or tool rooms and for small scale ceramic firings.

Because the elements are exposed to the furnace interior, a microswitch operates to cut the power supply as the door is opened. To prevent overheating, a 1250°C temperature fuse is fitted.

DIMENSIONS

	H		W		D
Internal	15	×	15	×	30 cm
	6	×	6	×	12 in
Overall	100	×	64	×	66 cm
	39	×	25	×	26 in
Base			46	×	55 cm
			18	×	21½ in
Weight, net			140 kg		
			310 lb		
Maximum power rating			5 kW		

For additional technical information refer to pages 274 to 276.

FR-655

BOX FURNACE, *Gallenkamp*, **automatic ON/OFF control for 1250°C** with 13 cm scale controller, energy regulator, element protection fuse and safety door switch. For single phase a.c. supplies.

For 200/250V	Each	**£305·00**	*g*
For 110/120V	Each	**£310·00**	*gN*

FR-657

BOX FURNACE, *Gallenkamp*, **automatic proportional control, for 1250°C,** with 13 cm scale controller, energy regulator, element protection fuse and safety door switch. For single phase a.c. supplies.

For 200/250V	Each	**£315·00**	*g*
For 110/120V	Each	**£318·00**	*gN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FR-660	**Heater spirals,** twelve are required for the furnace. Dozen £39·00	Each	£3·70	*b*
FR-664	**Hearth plate**	Each	£1·90	*m*
FR-670	**Temperature fuse,** 1250°C working ...	Each	£2·60	*m*
FR-672	**Twin bore sleeve,** for temperature fuse.	Pack of 5	£0·75	*b*
FR-674	**Outer protecting sheath,** for temperature fuse or thermocouple	Each	£1·30	*b*
FR-676	**Thermocouple element,** with insulators.	Each	£14·75	*m*
FR-678	**Lamp bulbs,** for controller indicating lamps and internal lamp. In pack of 3	Pack	£0·30	*c*
FR-680	**Photocell,** for ON/OFF controller ...	Each	£6·00	*m*
FR-681	**Photocell,** for proportional controller.	Each	£6·00	*m*

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

Items on this page normally available from stock except those coded *N*.

Gallenkamp SMALL BOX FURNACES 1400°C

SILICON CARBIDE HEATING ELEMENTS
MANUAL CONTROL

Furnaces for general laboratory work and heat treatment processes.

- Heating to 1400°C in 2¼ hours
- Reliable operation at maximum temperature
- Unobstructed access with swing-away door
- Optional element economiser transformer

A micro switch is fitted which disconnects the power supply from the elements as the door opens. A 1400°C temperature fuse safeguards the elements from overheating.

DIMENSIONS	H	W	D	
Internal	10 ×	12·5 ×	18	cm
	4 ×	5 ×	7	in
Overall	61 ×	48 ×	57	cm
	24 ×	19 ×	22	in
Base		51 ×	42	cm
		20 ×	16½	in
Weight, net		80 kg (175 lb)		
Maximum power rating		2·5 kW		

For additional technical information refer to pages 274 to 276.

FR-720

FR-720

BOX FURNACE, *Gallenkamp,* **manual control, for 1400°C,** with energy regulator, 9 cm scale pyrometer indicator and element protection fuse. For single phase a.c. supplies.

For 230/240V	Each	**£227·00**	*b*
For 210/220V	Each	**£232·00**	*bN*
For 200V	Each	**£232·00**	*bN*

FR-721

BOX FURNACE, *Gallenkamp,* **manual control, for 1400°C,** as FR-720 and with **element economiser transformer.** For single phase a.c. supplies.

For 230/240V	Each	**£251·00**	*b*
For 210/220V	Each	**£256·00**	*bN*
For 200V	Each	**£256·00**	*bN*

For details of the element economiser transformer see page 275.

When ordering please state voltage to nearest 10V and frequency of supply.

REPLACEMENT PARTS

FR-722	Heating elements, 10 mm ...	Set of 6	£30·00	*m*
FR-723	Temperature fuse, 1400°C working ...	Each	£2·20	*m*
FR-724	Outer protecting sheath, for temperature fuse or thermocouple	Each	£1·15	*b*
FR-672	Twin bore sleeve, for temperature fuse	For prices see entries in List No. sequence.		
FS-305	Thermocouple element, with insulators			

When ordering replacement elements please state voltage and whether element economiser transformer is fitted.

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

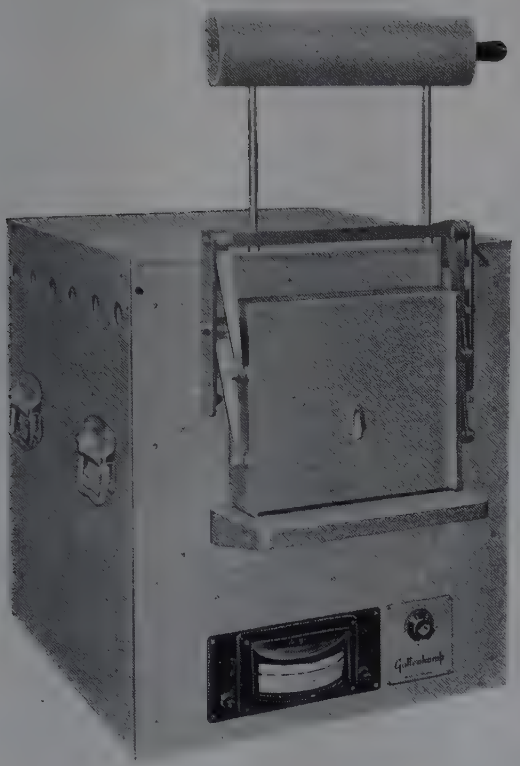
Items on this page normally available from stock except those coded *N*.

Gallenkamp BOX FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS
AUTOMATIC CONTROL

Furnaces for general laboratory work and heat treatment processes.

- **Heating to 1400°C in under 3 hours**
- **Fluctuation less than 5degC**
- **Reliable operation at maximum temperature**
- **Optional element economiser transformer**



FR-740

Operator and furnace safety are ensured by a door switch, a thermocouple breakage protection circuit, and an excess temperature fuse, each of which disconnects the power supply from the elements.

DIMENSIONS

Size No.	1	2	
	H W D	H W D	
Internal	10 × 15 × 30	15 × 23 × 38	cm
	4 × 6 × 12	6 × 9 × 15	in
Overall	93 × 57 × 70	102 × 61 × 79	cm
	36½ × 22½ × 27½	40 × 24 × 31	in
Base	53·5 × 55	61 × 62·5	cm
	21 × 21½	24 × 24½	in
Weight, net	138 kg (305 lb)	185 kg (400 lb)	
Power rating max.	3·5	6 kW	

For additional technical information refer to pages 274 to 276.

FR-740

BOX FURNACES, *Gallenkamp*, **automatic ON/OFF control for 1400°C** with 13 cm scale controller, energy regulator, door operated safety switch and element protection fuse. For single phase a.c. supplies.

Size No.		1	2	
For 230/240V	Each	**£375·00**	**£448·00**	*b*
For 210/220V	Each	**£380·00**	**£453·00**	*bN*
For 200V	Each	**£380·00**	**£453·00**	*bN*

FR-741

BOX FURNACES, *Gallenkamp*, **automatic ON/OFF control for 1400°C,** as FR-740 and with **element economiser transformer.** For single phase a.c. supplies.

Size No.		1	2	
For 230/240V	Each	**£400·00**	**£473·00**	*g*
For 210/220V	Each	**£405·00**	**£478·00**	*gN*
For 200V	Each	**£405·00**	**£478·00**	*gN*

For details of the element economiser transformer see page 275.

When ordering please state voltage to nearest 10V and frequency of supply.

The maximum power rating of these furnaces is relatively high for single phase electricity supplies. Furnaces can be made for operation on 3-phase supplies—details on request.

REPLACEMENT PARTS

		1	2	
FR-742	**Heating elements,** 14 mm.			
	Size No.	1	2	
	Set of	6	8	
	Per set	**£40·00**	**60·00**	*m*
FR-744	**Temperature fuse,** for 1400°C working.	Each	**£2·90**	*m*
FR-672	**Twin bore sleeve,** for temperature fuse	For prices see entries in List No. sequence.		
FR-674	**Outer protecting sheath,** for temperature fuse or thermocouple ...			
FR-676	**Thermocouple element,** with insulators			
FR-678	**Lamp bulbs,** for controller indicating lamps and internal lamp			
FR-680	**Photocell,** for controller ...			

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

When ordering replacement elements please state voltage and whether element economiser transformer is fitted.

Items on this page normally available from stock except those coded *N*.

Gallenkamp BOX FURNACE, 1500°C

MOLYBDENUM DISILICIDE HEATING ELEMENTS
AUTOMATIC CONTROL

A box furnace for control and research applications concerned with the behaviour of metals, ceramics and other materials in air at high temperatures.

- **Heating to 1500°C in 6 hours**
- **Fluctuation 5degC**
- **Safe low-voltage heating**

The furnace stands on a steel control unit which houses the controls and transformer needed to provide the low heater voltages required. The switch on the front panel is used to select the element supply voltage for particular operating conditions.

Safety Devices

The controller is 'fail safe' and has a thermocouple breakage protection circuit. A fuse fitted in the furnace cuts the power supply to the elements if 1500°C is exceeded.

Note: Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature **this furnace is not suitable for routine operation below 1000°C.**

For additional technical information refer to pages 274 to 276.

FR-770

DIMENSIONS

Furnace

	H W D
Working space	18×18×32 cm 7× 7×12½ in
Overall	107×84×85 cm 42×33×33½ in
Base	63·5×75 cm 25½×30 in
Weight, net	250 kg 540 lb

Control unit

	H W D
Overall	92×63×76 cm 36×25×30 in
Weight, net	195 kg 425 lb

Maximum power rating 10 kVA.

FR-770

BOX FURNACE, *Gallenkamp*, **automatic ON/OFF control for 1500°C** with control unit, transformer, 13 cm scale controller, energy regulator and element protection fuse. For 200/250V single phase a.c. supplies.
Each **£746·00** *g*

When ordering please state voltage and frequency of supply.

The maximum power rating of these furnaces is relatively high for single phase electricity supplies. Furnaces can be made for operation on 3-phase supplies—details on request.

REPLACEMENT PARTS

FR-772	**Heating elements.** Four are used in furnace FR-770.	Each £19·50 *m*
FR-774	**Temperature fuse,** for 1500°C working.	Each £1·80 *m*
FR-672	**Twin bore sleeve,** for temperature fuse	For prices see entries in List No. sequence.
FR-674	**Outer protecting sheath,** for temperature fuse or thermocouple ...	
FR-676	**Thermocouple element,** with insulators	
FR-678	**Lamp bulbs,** for controller indicating lamps and internal lamp	
FR-680	**Photocell,** for controller ...	

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

THE HEAT TREATMENT OF METALS

The use of *Gallenkamp* furnaces for the precision heat treatment of metals has become an accepted practice. A muffle furnace for preheating or for tempering combines ideally with a box furnace for hardening.

All items on this page normally available from stock.

Gallenkamp TUBE FURNACES, 1000°C or 1200°C

WOUND WIRE HEATING ELEMENTS
MANUAL CONTROL

General purpose tube furnaces especially suited to the determination of carbon and sulphur in steel and for other combustion or reduction work requiring horizontal work tubes.

Gallenkamp

FS-212
FS-215

DIMENSIONS

Bore	3·8 cm
	$1\frac{1}{2}$ in
Length	30 cm
	12 in
	H W D
Overall	37 × 33 × 23 cm
	$14\frac{1}{2}$ × 13 × 9 in
Base	32·5 × 22 cm
	13 × $8\frac{3}{4}$ in
Maximum power rating	1·0 kW
Weight, net	20 kg
	45 lb

For additional technical information refer to pages 274 to 276.

Safety Devices

To prevent damage from accidental overheating, all furnaces are equipped with easily replaceable temperature fuses; furnace FS-212 is fitted with fuse FS-249 to permit working to 1000°C; furnace FS-215 is fitted with fuse FS-250 to permit 1200°C working.

- **Heating to 1200°C in $1\frac{1}{4}$ hours**
- **Suitable for use with or without additional work tubes**

FS-212

TUBE FURNACE, *Gallenkamp,* **manual control, for 1000°C,** with energy regulator, 5·7 cm scale pyrometer indicator and 1000°C element protection fuse FS-249. For single phase a.c. supplies.

For 220/240V	Each	**£66·50**	*b*
For 200/210V	Each	**£69·50**	*bN*
For 110/120V	Each	**£69·50**	*bN*

FS-215

TUBE FURNACE, *Gallenkamp,* **manual control, for 1200°C,** with energy regulator, 5·7 cm scale pyrometer indicator, and 1200°C element protection fuse FS-250. For single phase a.c. supplies.

For 220/240V	Each	**£82·50**	*b*
For 200/210V	Each	**£85·50**	*bN*
For 110/120V	Each	**£85·50**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FS-240	**Wound tube refractories,** for FS-212 and FS-215.			
	For 200/210 or 220/240V	Each	**£7·50**	*b*
	For 110/120V	Each	**£11·50**	*bN*
FS-249	**Temperature fuse, 1000°C working,** for FS-212.	Each	**£4·40**	*m*
FS-250	**Temperature fuse, 1200°C working,** for FS-215.	Each	**£7·00**	*m*
FS-252	**Single bore sleeves,** for temperature fuses.	Pack of 3	**£0·05**	*b*
FS-254	**Thermocouple elements,** with insulators, for FS-212.	Each	**£1·20**	*b*
FS-256	**Thermocouple elements,** with insulators, for FS-215.	Each	**£10·00**	*m*

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

For combustion boats see BR-620 et seq. in List No. sequence.

For furnace work tubes see FS-860 et seq. in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp TUBE FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS
MANUAL CONTROL

High temperature horizontal tube furnaces designed particularly for combustion work, including the determination of carbon and sulphur in all types of steel, and sulphur in coal and petroleum products. Also suitable for other tests including Ash Fusion Points and general analysis of organic compounds in various atmospheres.

The furnace is supplied fitted with a platinum : 13% rhodium platinum thermocouple ready wired to the pyrometer for temperature indication.

Removable covers at either side of the furnace provide easy access to both heating elements and their flexible connectors.

Power to the heating elements is supplied from a four-range step-down transformer which permits the voltage applied across the elements to be increased as their resistance increases due to ageing, and so maximises the useful life of the elements.

- **Heating to 1400°C in under 2 hours**
- **Easily replaceable heating elements**

FS-300

DIMENSIONS

Bore	3·0 cm ($1\frac{3}{16}$ in)
Heated length	15 cm (6 in)
	H W D
Overall	57 × 47 × 36 cm
	$22\frac{1}{2}$ × $18\frac{1}{2}$ × 14 in
Base	39·5 × 32 cm
	$15\frac{3}{4}$ × $12\frac{3}{4}$ in
Maximum power rating	1·25 kW
Weight, net	77 kg (170 lb)

For additional technical information refer to pages 274 to 276.

FS-300

TUBE FURNACE, *Gallenkamp*, **manual control,** for **1400°C,** with 4-step transformer, energy regulator, and 9 cm scale pyrometer indicator. For single phase a.c. supplies. **Requires but does not include work tube.**

For 200/250V	Each	**£164·00** *b*
For 110/120V	Each	**£165·00** *bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FS-304	**Heating element, 14 mm dia.** Two required.	Each	**£6·75** *m*
FS-305	**Thermocouple element,** with insulators.	Each	**£12·50** *m*

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

For combustion boats see BR-620 et seq. in List No. sequence.

For furnace work tubes see FS-860 et seq. in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp TUBE FURNACE, 1500°C

MOLYBDENUM DISILICIDE HEATING ELEMENTS
AUTOMATIC CONTROL

FS-400 without control unit

The step-down heater voltage transformer is housed with the controls in a steel unit separate from the furnace.

DIMENSIONS

Furnace

Size No.	1	2	
Heating chamber length	27 cm (10½ in)	32 cm (12½ in)	
Outside diameter of work tube	39 mm (1½ in)	80 mm (3¼ in)	
	H W D	H W D	
Overall	46 × 53 × 38 cm	53 × 71 × 46 cm	
	18 × 21 × 15 in	21 × 28 × 18 in	
Base	52 × 36 cm	47 × 71 cm	
	20½ × 14¼ in	18 × 28 in	
Weight, net	50	120	kg
	110	260	lb

Control unit

	1	2	
	H W D	H W D	
Overall	57 × 57 × 38 cm	57 × 57 × 38 cm	
	22½ × 22½ × 15 in	22½ × 22½ × 15 in	
Weight, net	190	310	lb
	85	140	kg
Maximum power rating	2·5	7·0	kVA

Tube furnaces for research and control applications concerned with the behaviour of materials at high temperature in specific atmospheres. The smaller furnace is especially suitable for the determination of the fusibility of coal ash and coke ash.

- **Heating to 1500°C in 4½ hours**
- **Reliable operation at maximum temperature**
- **Fluctuation about 1degC**

Safety Devices

A thermocouple breakage protection circuit is built into the 'fail-safe' controller and an element protection fuse prevents the element being overheated.

Note: Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature **these furnaces are not suitable for routine operation below 1000°C.**

For additional technical information refer to pages 274 to 276.

FS-400

TUBE FURNACES, *Gallenkamp,* **automatic ON/OFF control, for 1500°C,** with step-down transformer, 13 cm scale controller, energy regulator, and element protection fuse. For single phase a.c. supplies. **Requires but does not include work tube.**

Size No.		1	2	
For 200/250V	Each	£358·00	£443·00	g

When ordering please state voltage and frequency of supply.

The maximum power rating of the Size No. 2 furnace is relatively high for single phase electricity supplies. Furnaces can be made for operation on 3-phase supplies—details on request.

REPLACEMENT PARTS

FS-410	**Heating element,** for furnace Size No. 1, one required.	Each £14·40	m
FS-412	**Heating element,** for furnaces Size No. 2, two required.	Each £18·00	m
FR-774	**Temperature fuse,** for 1500°C working	For prices see entries in List No. sequence.	
FR-672	**Twin bore sleeve,** for temperature fuse		
FR-674	**Outer protecting sleeve,** for temperature fuse or thermocouple		
FR-676	**Thermocouple element,** with insulators		
FR-678	**Lamp bulbs,** for controller indicating lamps and internal lamp		
FR-680	**Photocell,** for controller		

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

For combustion boats see BR-620 et seq. in List No. sequence.

For furnace work tubes see FS-860 et seq. in List No. sequence.

All items on this page normally available from stock.

FURNACE WORK TUBES

The range listed below to suit *Gallenkamp* furnaces are normally available from stock.

Refractory tubes other than fused silica are sensitive to thermal shock and care should be taken to avoid unnecessarily rapid temperature changes, particularly with the less resistant materials.

All dimensions given below are nominal.

FS-860

TUBES, FURNACE WORK, translucent fused silica, for use up to 1050°C with inert or oxidising atmospheres. These tubes have very high thermal shock resistance.

Ext. dia.	31	42 mm	
Int. dia.	25	35 mm	
Length	610	660 mm	
Each	**£2·90**	**3·50**	*m*

FS-865

TUBES, FURNACE WORK, impervious aluminous porcelain, for use up to 1500°C with inert or oxidising atmospheres. These tubes have moderate thermal shock resistance.

Ext. dia.	28·5	32	46 mm	
Int. dia.	22·5	25·5	38 mm	
Length	660	600	660 mm	
Each	**£2·70**	**2·60**	**4·20**	*m*

FS-870

TUBES, FURNACE WORK, porous fused alumina, for use up to 1700°C with inert, oxidising or reducing atmospheres. These tubes have high thermal shock resistance.

Ext. dia.	38·5	80 mm	
Int. dia.	28·5	65 mm	
Length	675	825 mm	
Each	**£5·20**	**10·75**	*m*

FS-875

TUBES, FURNACE WORK, impervious fused mullite, for use up to 1700°C with inert or oxidising atmospheres. Also suitable for use with hydrogen over short periods up to 1000°C, but at higher temperatures may become porous. These tubes have moderate thermal shock resistance.

Ext. dia.	28·5	46 mm	
Int. dia.	22·5	38 mm	
Length	660	660 mm	
Each	**£4·50**	**7·00**	*m*

Gallenkamp CARIUS LOW TEMPERATURE FURNACE, 300°C

FOR DETERMINATIONS OF SULPHUR AND HALOGENS

The case is constructed of asbestolite panels and fitted with a hinged front cover which is secured by a screw clamp. The heating chamber, which has double walls filled in with fibreglass insulation, is heated by elements distributed along the sides and bottom. This gives uniform temperature distribution along four steel tubes placed longitudinally in the furnace. These tubes, which are open at both ends, contain smaller steel tubes, also open ended, into which the glass reaction tubes are inserted. The inner tubes are intended to be plugged with glass wool. A perforated metal box covers the rear ends of the tubes. Both this box and the door are filled with glass wool which reduces the effect should a glass tube burst. The furnace temperature is controlled by an energy regulator and a thermometer pocket is provided.

DIMENSIONS

Outer steel tubes	35 mm dia. × 68·5 mm
Inner steel tubes	29 mm dia. × 69 mm
Overall	41 × 28 × 75 cm
Base	28 × 67·5 cm
Weight, net	32 kg
Maximum power rating	1 kW

FS-900

CARIUS FURNACE, *Gallenkamp*, with energy regulator, on/off switch and indicator light. For single phase a.c. supplies. **Without thermometer.**

For 220/240V	Each	**£125·00**	*b*
For 200/210V	Each	**£135·00**	*bN*
For 110/120V	Each	**£135·00**	*bN*

When ordering please state voltage and frequency of supply.

The Carius reaction is well known to be a hazardous one and suitable precautions must be taken to minimise the risk of injury to personnel.

FS-900

REPLACEMENT PART

FS-905	Heating elements	Set	**£1·80**	*b*

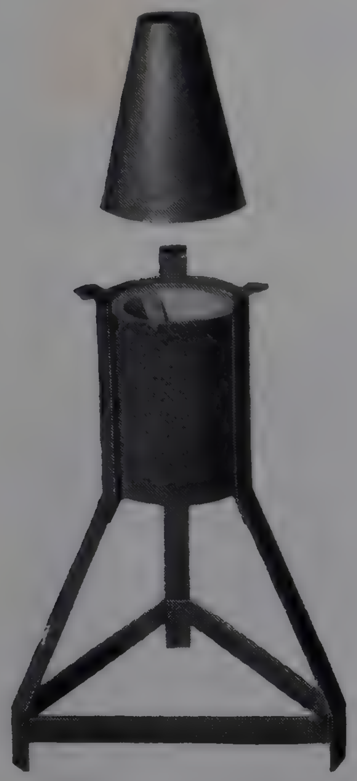
When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

ACCESSORIES

TW-430	Carius tube...	For prices see entries in List No. seqence.
TJ-060	Thermometer 0 260°C	

Items on this page normally available from stock except those coded *N*.

GAS FIRED FURNACES



FT-110 and FT-112

FT-110

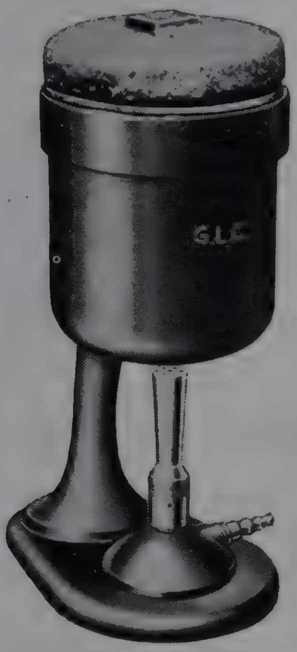
CRUCIBLE FURNACE, Davies. Used with a suitable Bunsen burner, this small furnace attains a temperature of 1000°C which is ideal for the reduction, fusion and melting of many metals and alloys. It may also be used for incineration. When not in use as a furnace it will replace an ordinary tripod with the additional advantage that it functions as a flame protector. The furnace comprises a fireclay body insulated with asbestos and contained in a sheet metal jacket which is supported on three braced feet. Suitable for porcelain crucibles of 30 to 46 mm diameter. **Without burner** ... ... Each **£6·00** *b*

FT-112

CRUCIBLE FURNACE, Davies, as FT-110 but larger size suitable for porcelain crucibles of 56 to 81 mm diameter. **Without burner** ... ... Each **£7·00** *b*

For suitable **crucibles**—see CW-210 et seq. in List No. sequence.

For suitable **burners**—see BX-020, BX-045 in List No. sequence.



FT-150 with FT-152

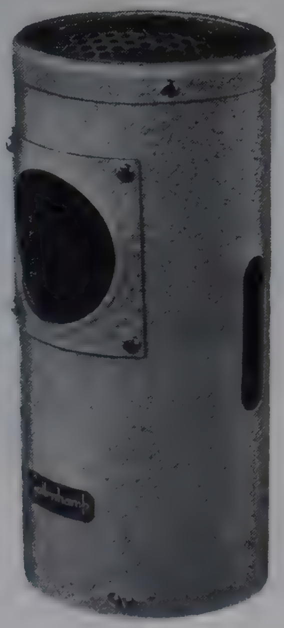
FT-150

CRUCIBLE FURNACE, for temperatures up to 1100°C using a Bunsen burner FT-152 or FT-154. Comprises a semi-insulating refractory body of very low heat capacity supported by a metal jacket which is mounted on a rigid platform. Three solid projecting fins locate the crucible in the heating chamber and a lid of the same refractory material is provided with ribs on the underside to allow the escape of hot gases. Maximum crucible size 38 mm dia. **Without burner** ... ... Each **£8·00** *f*

ACCESSORIES

FT-152	**Burner, Bunsen,** for towns (coal) gas...	Each	£3·75	*f*
FT-154	**Burner, Bunsen,** for natural (methane) gas.	Each	£4·37	*f*

For suitable **crucibles**—see CW-210 et seq. in List No. sequence.



CX-600

Gallenkamp

LOOP FLAMING INCINERATOR

For flame sterilising platinum loops

Comprises a gas burner in a steel hood and mounted on a heavy base for stability.

For full details and price see CX-600 in List No. sequence.

All items on this page normally available from stock.

LABORATORY FURNITURE AND FITTINGS

INTRODUCTION

Gallenkamp development and expertise, coupled with continuous close contact with scientists and architects concerned with the needs of every branch of science, have produced the many trend-setting items of laboratory furniture and fittings described in this catalogue. At the same time, ever increasing demand and improved productivity have resulted in such refined and sophisticated equipment becoming available at realistic prices. Timber and plastics faced standard furniture units are manufactured in seven main styles of finish, each being obtainable with minor variations to suit six alternative types of bench assembly. This offers forty-two alternative approaches to every design exercise. It will be seen from the illustrations that we have maintained the clean contemporary lines which have distinguished our furniture for many years.

We offer consultation on all matters concerning laboratory design and will assist gladly in the selection of furniture and equipment to suit particular needs. Customers are invited to call at our showroom, or we can arrange technical representation to meet their convenience.

In addition to the finishes and bench assembly methods listed, we can also supply purpose-made benches and fittings to suit individual requirements.

FURNITURE: STYLES OF FINISH

Standard bench units are available to suit any budget, purpose and decor. Furniture finished in oak or mahogany can be supplied at three price levels; plastics-faced and teak and plastics faced 'tropical' ranges complete the list from which selection may be made. A general description is given on pages 296/7.

FURNITURE: TYPES OF BENCH ASSEMBLIES

Much emphasis is now placed on flexibility of furniture layout and on pages 294/5 it is shown that we supply benches of the static or fully mobile type with varying degrees of mobility between the two extremes. Standard bench units are used for all these applications, with only minor variations to suit whichever type of bench assembly is selected. Although there is a wide choice in unit finishes and types of assembly, we employ quantity production methods throughout and this results in reasonable prices for high grade workmanship and materials.

FUME CUPBOARDS AND EXTRACTION EQUIPMENT

Fume cupboards, exhaust fans and ducting are illustrated on pages 316 to 327. Customers interested in this equipment are asked to contact our Laboratory Furniture Division and request the separate literature which is available. Nowadays it is recognised that extraction equipment is one of the most important features in chemical laboratories. Our current range of controlled and balanced draught fume cupboards are highly resistant to corrosion and easily cleaned and decontaminated. While using the more advanced units it is not necessary to have the sash lowered to retain fumes and suitably glazed it can be regarded purely as a safety screen. We are proud of our achievements in this field and customers are invited to approach us with their problems.

ANCILLARY EQUIPMENT

Reference is also made to sink units, apparatus cupboards, desks, laboratory sinks, service taps and fittings, which we hope will be of interest and assistance to those contemplating new installations.

K

FURNITURE SECTION

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IF YOU ARE PLANNING NEW LABORATORIES

a Gallenkamp negotiated contract will provide
Free Specialist Consultancy

YOU WILL WANT TO KNOW—

Will the furniture suit the apparatus which will be used?

How much space is necessary for each worker and operation?

What are optimum gangway sizes?

How will instrumentation affect space requirements?

Should plastics faced or timber benches be specified?

Should an open, bay or enclosed plan be adopted?

What are the best materials for benches, services, fume cupboards and exhaust equipment?

Can a laboratory be comprehensively furnished when funds are limited?

Should benches be static, semi-fixed or fully mobile?

What is the best form of space heating in a laboratory?

What should be the sizes of the mains and the diversity factor for each service?

Are heavy duty fume cupboards available for open sash working?

How effectively is conditioned air conserved by balanced-draught fume cupboards?

How should decor be planned?

Can the entire layout be altered, in say a year's time, at small expense?

These questions are illustrative of the many which confront the laboratory designer. No attempt is made here to provide the answers but clients who would like our views on these and similar points are invited to get in touch with the *Gallenkamp* Laboratory Furniture Division.

Not so many years ago it was popularly held that a laboratory project was a simple exercise in joinery, but today it is recognised that the co-ordinated efforts of several specialist designers are necessary if the resulting installation is to be really efficient. Scientists and architects are able to obtain such consultancy at all stages, without charge, by specifying *Gallenkamp* as the nominated contractor. The service includes pre-planning discussions and the preparation of drawings, specification and costs, together with liaison with allied contractors.

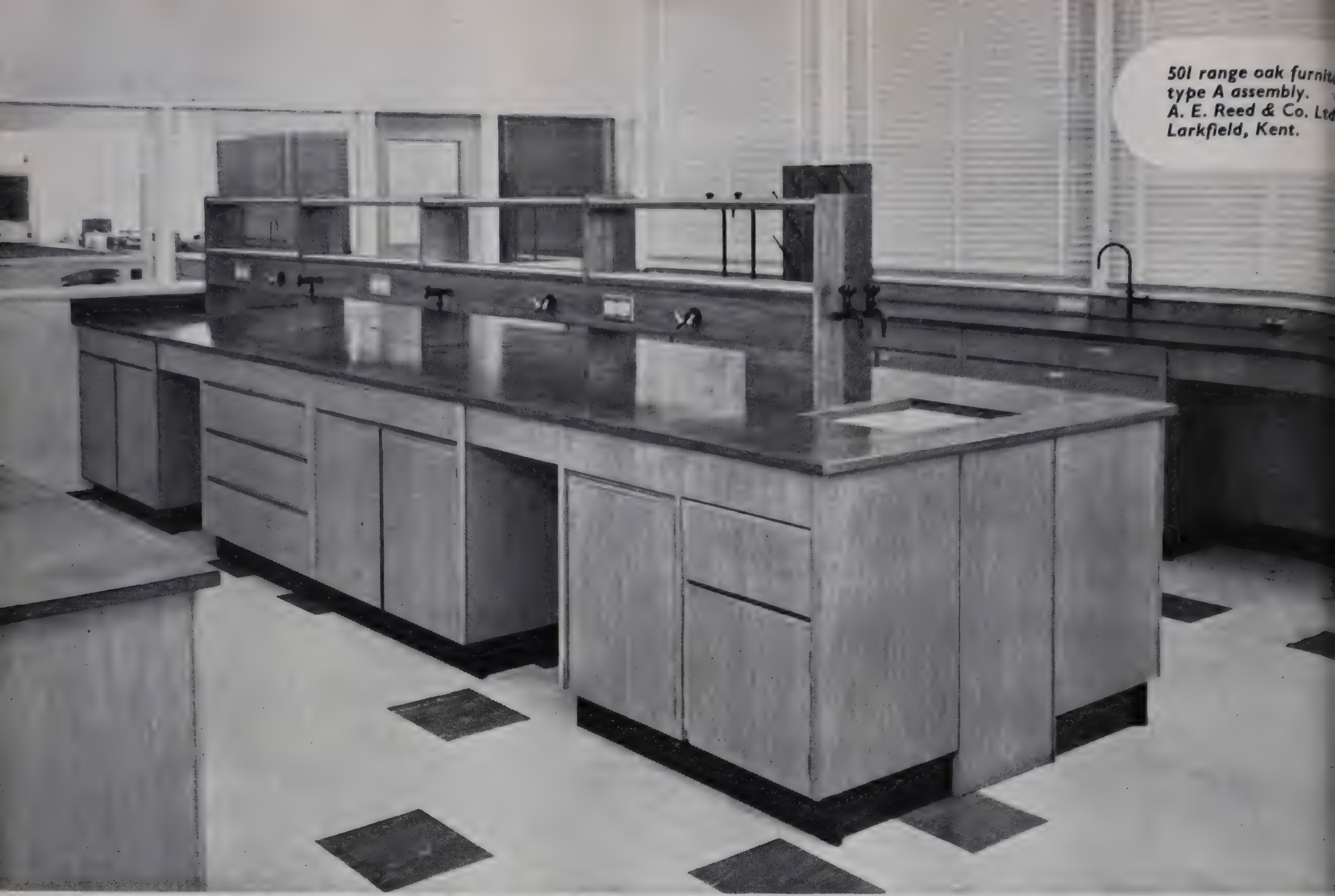
Examine the implications of such an arrangement. The advantage of having a team of specialist designers available is obvious. On the other hand users may feel they are losing the main benefit of competitive tendering—that of accepting the lowest price out of a number of offers. Whilst this is true it is also a fact that *Gallenkamp* frequently enjoy success in competitive tendering by reason of low price and unsuccessful bids are rarely more than a marginal amount above the lowest. It makes no difference whether estimates are competitive or in respect of a negotiated contract—quality and quoted prices do not vary. Thus the user is assured that the negotiated contract will be carried out at a reasonable price, and in return the *Gallenkamp* Laboratory Furniture Division uses its full resources to ensure that the installation is successful in all respects. This company has a long term interest as a supplier to the user and the combination of scientist, architect and nominated contractor is ideal. Projects tackled in this way are certainly among the more successful.

Where competitive tendering is considered necessary, *Gallenkamp* offer a useful service. Catalogues of benches, fume cupboards and ancillary equipment of many types are available to assist users in the preparation of their specification and drawings, and there are representatives to discuss the details of a scheme before tenders are invited. It is particularly important that the specification sent out to tenderers should be complete in all details as otherwise the user is faced with an extremely difficult task when adjudicating the offers. We have known laboratories spoiled by points in the specification being misinterpreted by lay manufacturers, mistakes not realised until the contract had been awarded purely on the basis of the lowest estimated price. By the time such discrepancies are adjusted the final contract price is possibly by no means the lowest. A correctly framed specification will avoid such trouble.

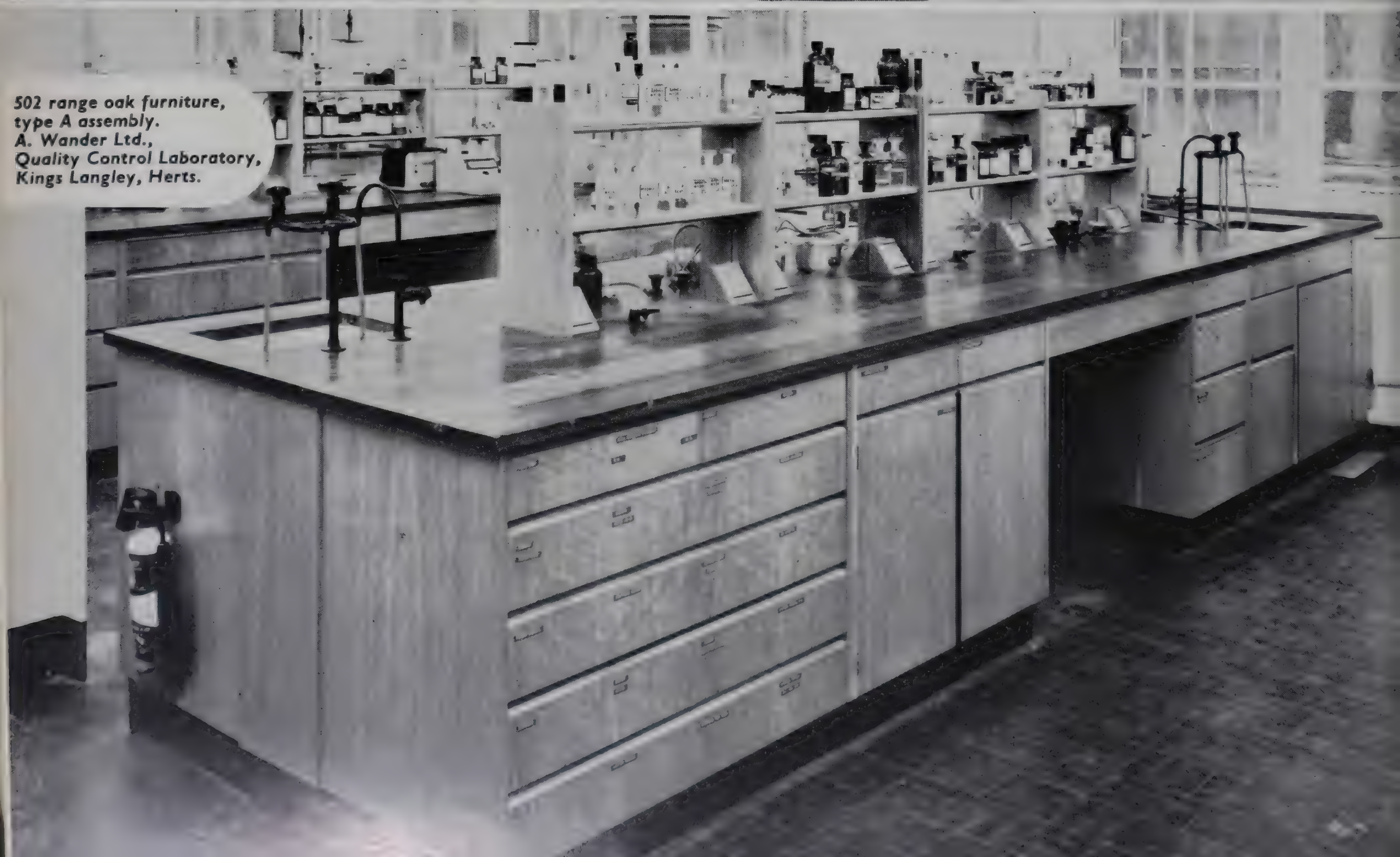
Gallenkamp welcome competitive enquiries but commend the Negotiated Contract system as being particularly worthy of consideration. Only in this way can the accumulated knowledge and experience of many and diverse specialist designers, working with the user and his advisers, be brought fully to bear.

This is an approach too important to be ignored!

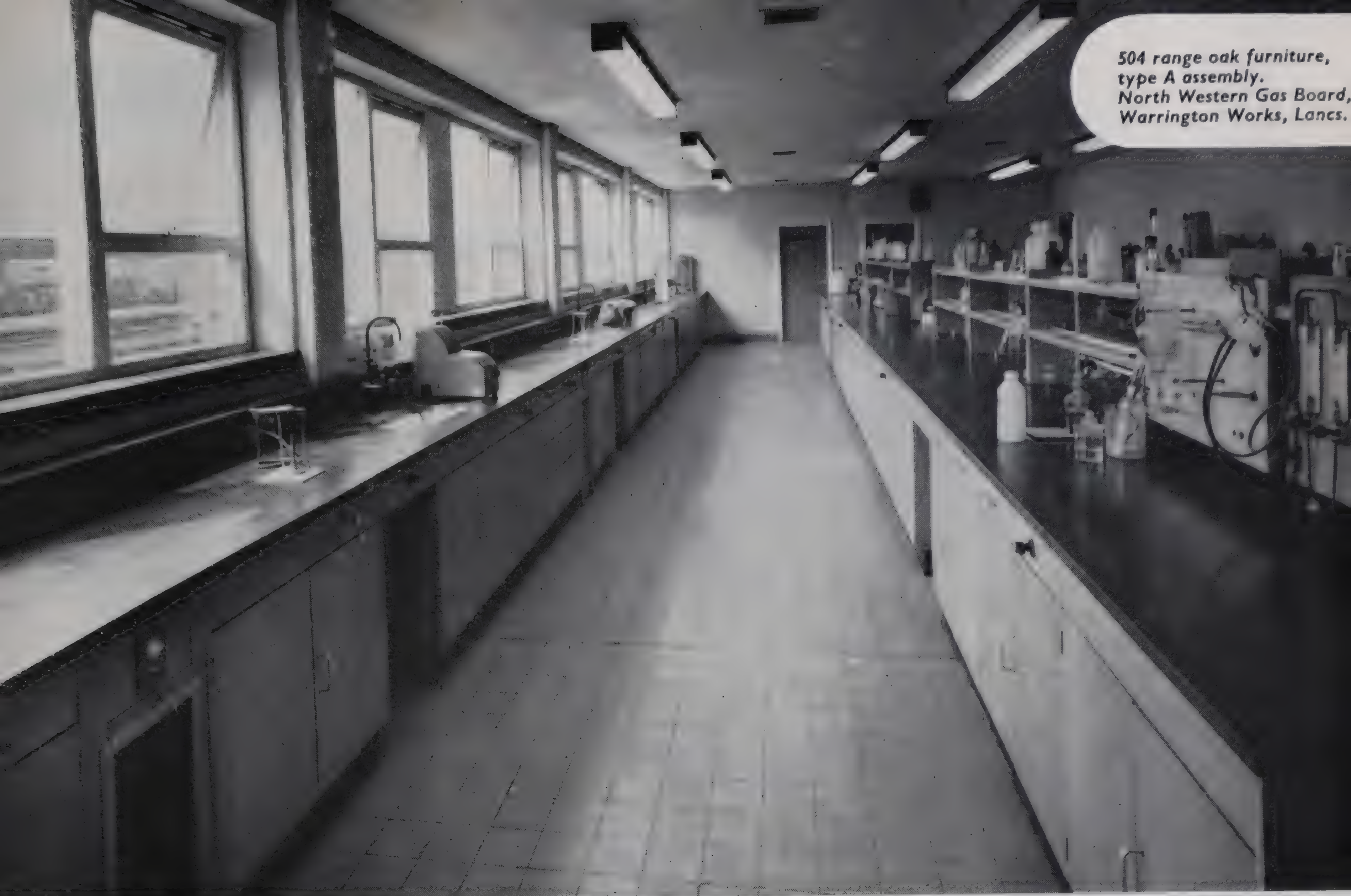
Why not investigate it with us?



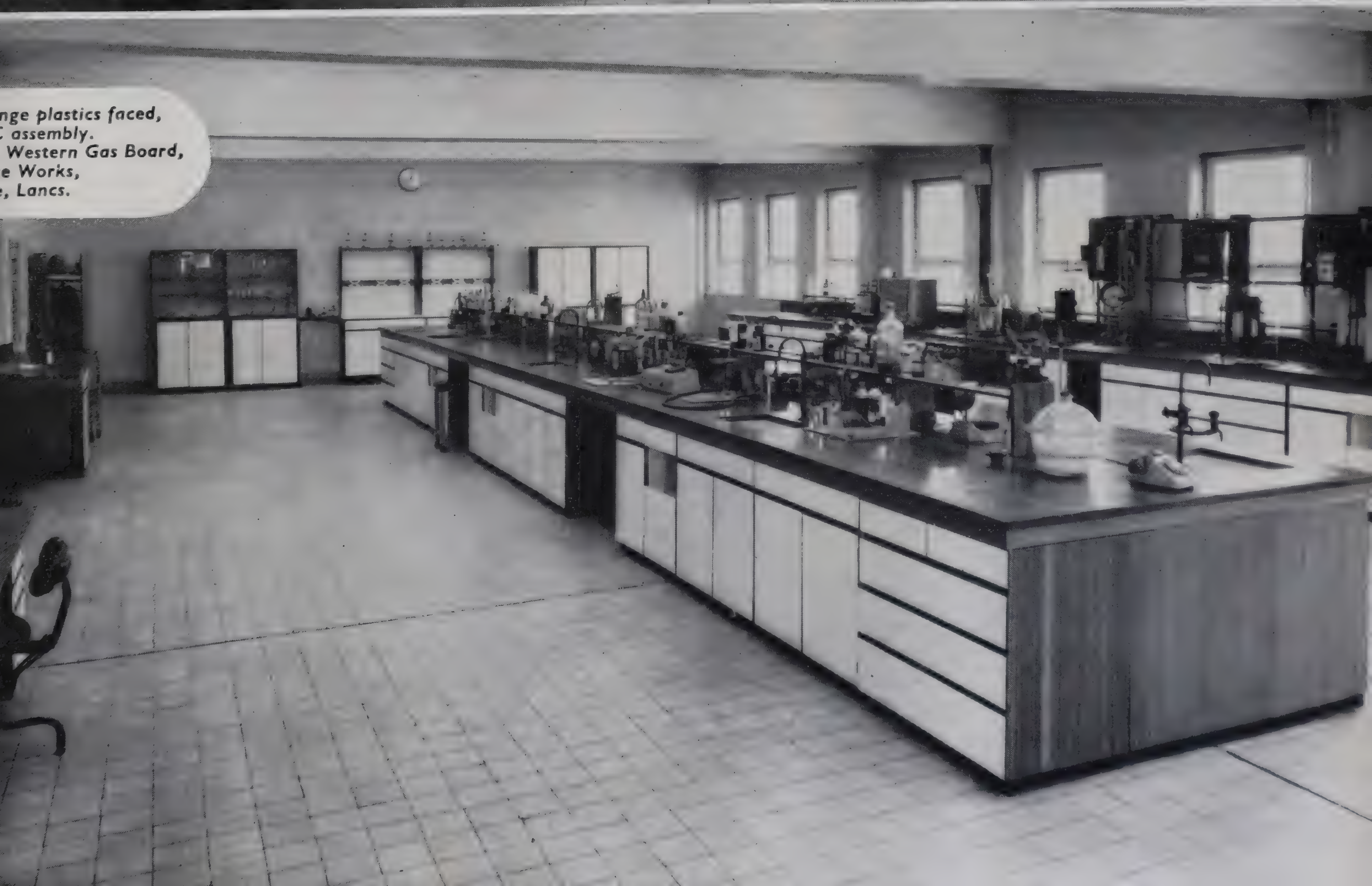
501 range oak furnit
type A assembly.
A. E. Reed & Co. Ltd
Larkfield, Kent.



502 range oak furniture,
type A assembly.
A. Wander Ltd.,
Quality Control Laboratory,
Kings Langley, Herts.

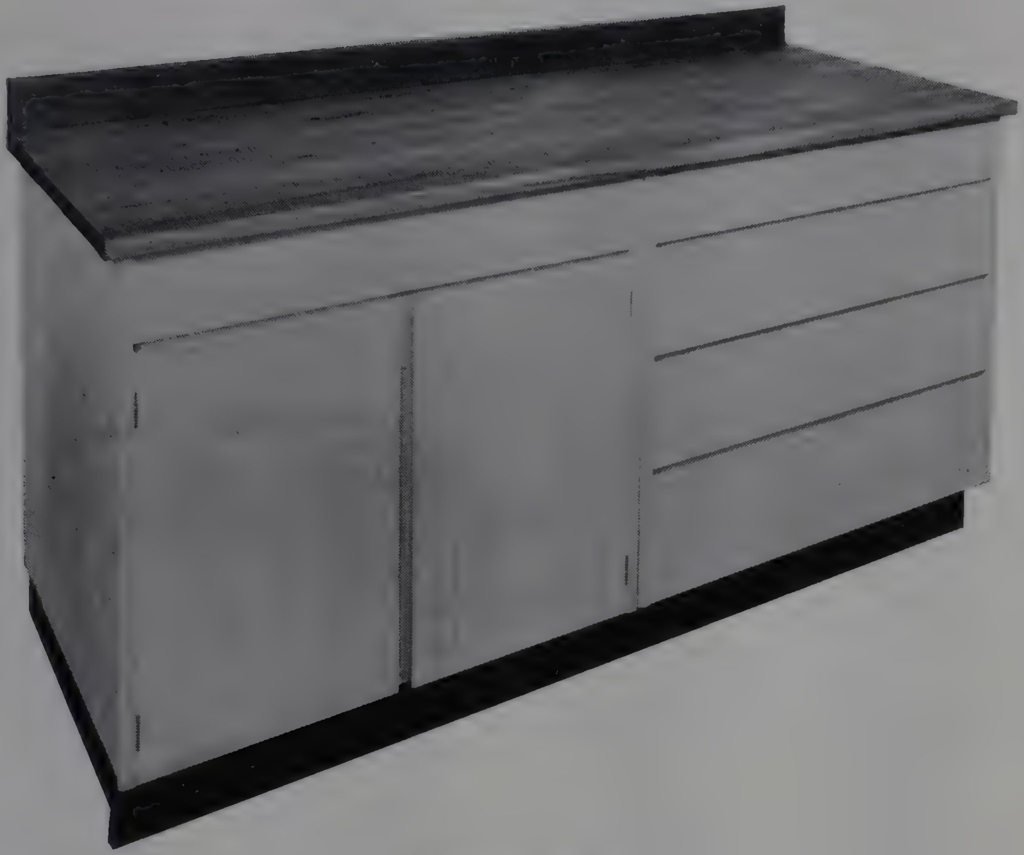


504 range oak furniture,
type A assembly.
North Western Gas Board,
Warrington Works, Lancs.



nge plastics faced,
C assembly.
Western Gas Board,
e Works,
e, Lancs.

TYPES OF BENCH ASSEMBLY



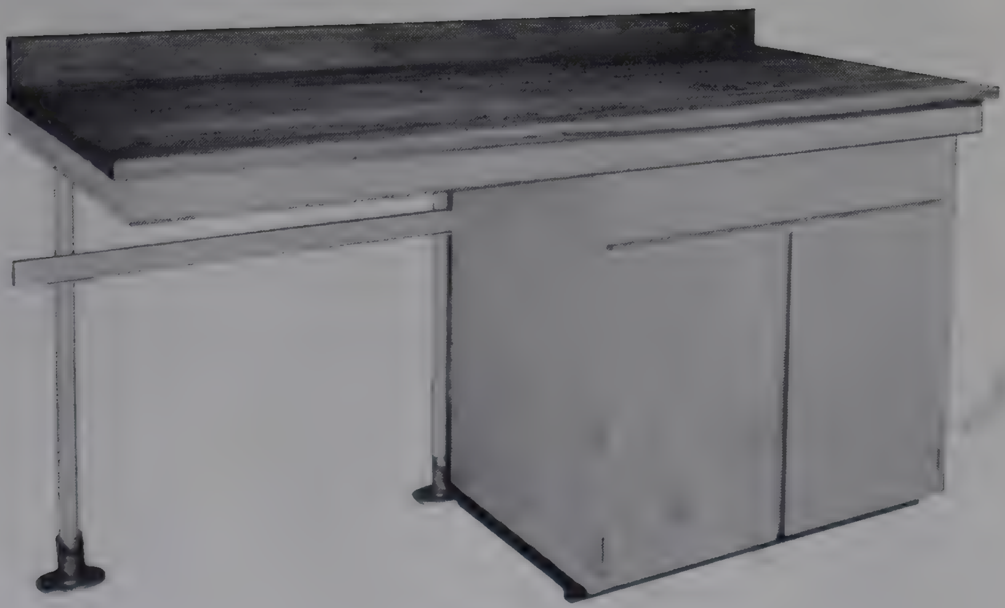
TYPES A and B

TYPE A

The bench top is mounted directly on to the units, which perform the dual functions of storing apparatus and supporting the bench top. Working height is 3 ft. Pipes are mounted either on the walls behind bench units or on the units themselves; in the case of island benches they are run in the service space at the centre. This is the most economical form of bench construction.

TYPE B

The bench top is mounted directly on to the units, as in type A. The working height is 2 ft 9 in or 2 ft 10 in, as specified. Pipe runs are accommodated exactly as for type A benches.



TYPE C

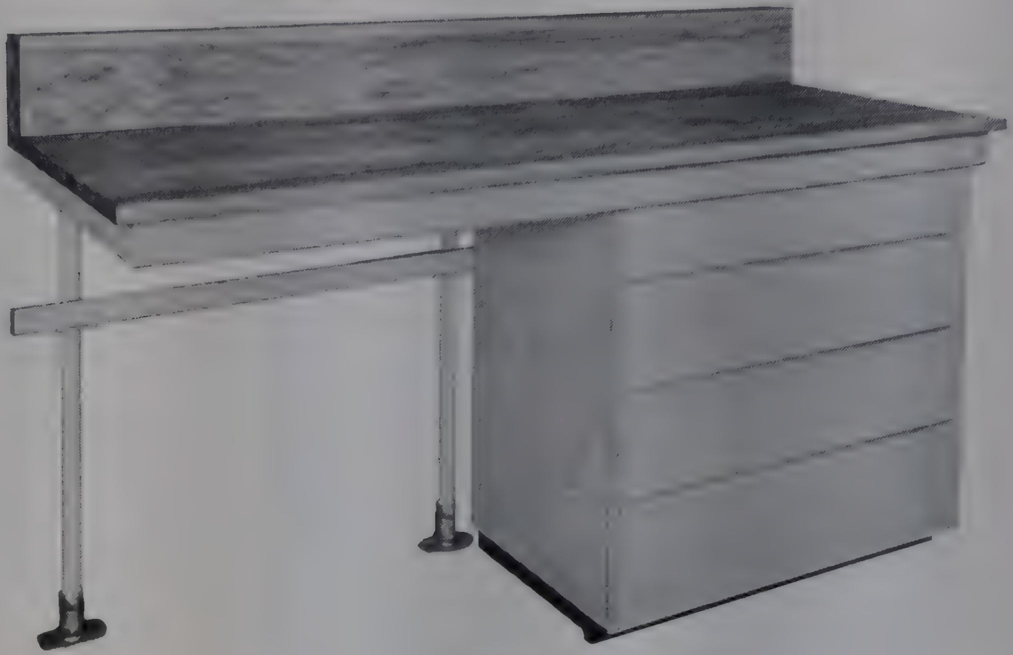
TYPE C

The bench top is mounted independently of the units by means of floor stands provided with integral cantilever brackets. The working height is 3 ft. Bench units can easily be rearranged to suit changing requirements and all units are provided with height adjusters and dust covers. A continuous rail beneath the bench top provides space for mounting remote control taps. Pipe runs are mounted on special brackets which are available for fixing to the floor stands.

TYPES OF BENCH ASSEMBLY

TYPE D

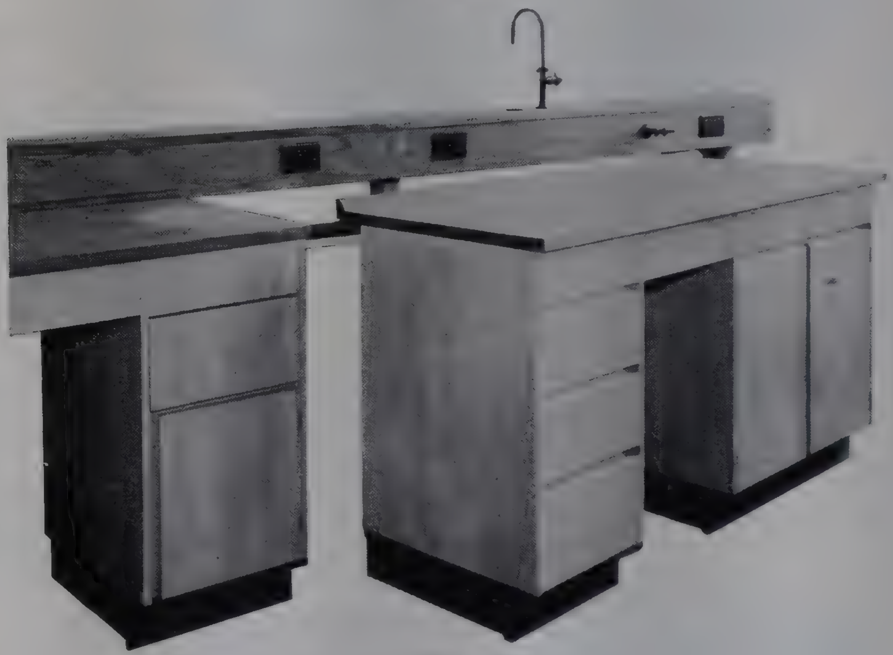
The bench top is mounted in a manner similar to type C but there is the addition of a horizontal service box at the rear. This is particularly useful where bench top cleanliness is a criterion as it is unencumbered by service taps, which are mounted on the riser of the service box. Underbench units are fitted with height adjusters and dust covers.



TYPE D

TYPE E

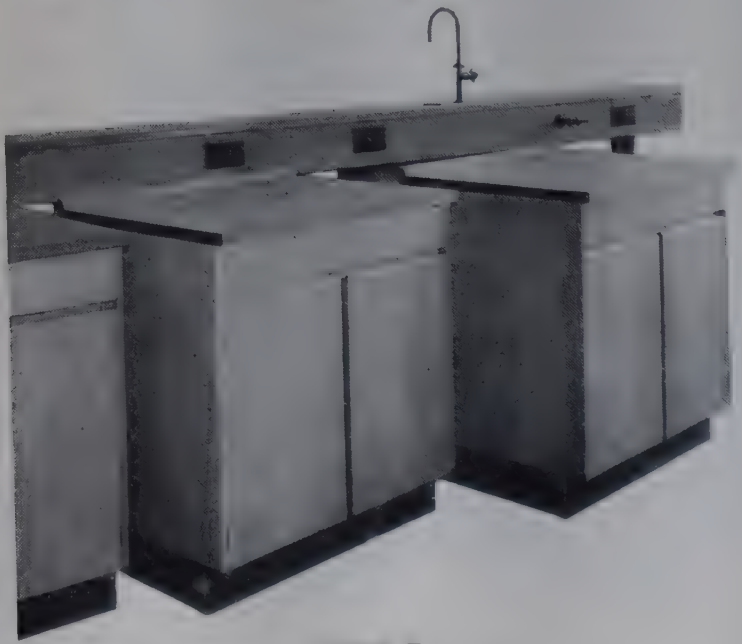
The bench top is mounted directly on to the units but is quite separate from the service box, which runs horizontally at the rear of the bench or at the centre in the case of an island bench The removable bench can be made to any desired length, but it is usual not to exceed 9 ft. Working height is 3 ft. Plumbing runs are fixed to the supporting frame assembly which, in the case of a wall bench, is in turn fixed to the wall. For an island bench it is self supporting Should access be required to the plumbing it is a simple matter to remove the entire bench to expose the services. Underbench units are fitted with height adjusters and dust covers.



TYPE E

TYPE F

The sectional bench top is quite separate from the service box. Each bench unit is provided with an integral and separate working top. Sections are butted one to another with sealing strips. Working height is 3 ft. A bench so assembled can be re-arranged with little effort. Underbench units are fitted with height adjusters. Bench sections may be removed to give service space to floor standing apparatus.



TYPE F

Gallenkamp STANDARD BENCH UNITS

501 RANGE

All *Gallenkamp* **bench units are attractively styled and incorporate the best features of modern practice. In all timber faced units the veneers are carefully matched to ensure continuity of grain and have exposed faces finished in natural colour, matt polished. Large scale production methods enable each range to be marketed at competitive prices. Many units are fitted with removable backs for access to service runs.**

HEIGHTS OF UNITS

2 ft 11 in for assembly types A, E and F
2 ft 8 in for assembly types B, C and D

GENERAL SPECIFICATIONS

501 RANGE—OAK or MAHOGANY FINISH

Manufactured to optimum standards of commercial joinery to provide a range of furniture of the highest quality for those requiring a prestige laboratory installation. Constructed with blockboard ends, chipboard doors and multiply drawer fronts, all finished with matched veneers having continuous vertical grain. Drawer sides and backs are of hardwood, with all joints dovetailed. Drawer and cupboard bottoms are of heavy quality plywood. External finish matt polished natural colour, with ebonised plinths. Plywood cupboard backs are removable. All door and drawer pulls are recessed to give a completely flush exterior.

Oak illustrated.

502 RANGE

502 RANGE—OAK or MAHOGANY FINISH

A reasonably priced range of attractively styled and robustly constructed bench units.

Constructed with chipboard ends and doors, and multiply drawer fronts. Veneered to give a continuous vertical grain. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Finished in natural colour, matt polished, with ebonised plinths. Removable cupboard backs of hardboard. All door and drawer pulls are recessed to give a completely flush exterior.

Mahogany illustrated

Gallenkamp STANDARD BENCH UNITS

GENERAL SPECIFICATIONS

504 RANGE

504 RANGE—OAK or MAHOGANY FINISH

Designed specifically to enable a laboratory to be comprehensively equipped on a limited budget. Whilst units are not expensive a high standard of construction and finish is maintained.

Constructed with chipboard ends and doors, with blockboard drawer fronts, veneered. Drawer sides and backs of hardwood with dovetailed joints. Drawer and cupboard bottoms of plywood. Removable backs of hardboard. 'D' type drawer and door pulls of polished aluminium. Finished in natural colour, matt polished, with ebonised plinths.

Oak illustrated.

505 RANGE—MELAMINE PLASTICS FACED

Decorative appearance yet strictly functional. Easily cleaned and decontaminated. Designed specifically for prestige installations.

Constructed with chipboard ends, veneered externally in sapele mahogany. Doors and drawer fronts of multiply faced with white melamine plastics. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Removable cupboard backs of hardboard. Recessed drawer and door pulls. Ebonised plinths.

HEIGHTS OF UNITS

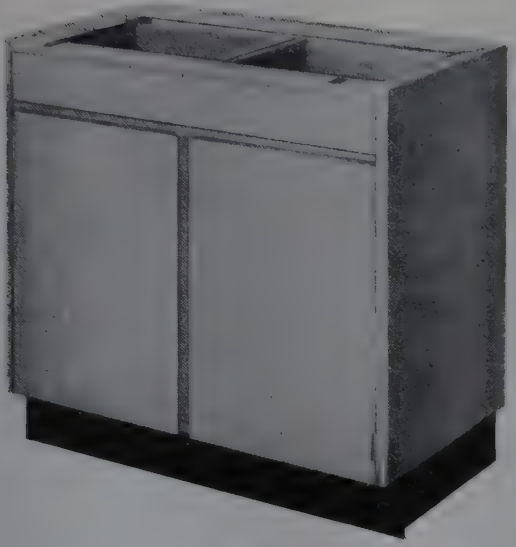
2 ft 11 in for assembly types A, E and F
2 ft 8 in for assembly types B, C and D

506 RANGE—TROPICAL

Designed primarily for export to tropical and termite infested areas. They are constructed with teak framing and flush melamine plastics faced panels and doors. They can, if required, be 'broken down' for economical packing. (Not illustrated.)

505 RANGE

Gallenkamp STANDARD BENCH UNITS



FU-511

NOTE: Prices given below are exclusive of bench tops and do not include Purchase Tax.

For suitable bench tops see page 305.

CUPBOARD AND TWO DRAWER UNIT, 3 ft wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
FU-511	501	Oak or Mahogany	£ **28·00**	*f*
FU-512	502	Oak or Mahogany	**27·00**	*f*
FU-514	504	Oak or Mahogany	**24·00**	*f*
FU-515	505	Plastics faced	**32·00**	*f*

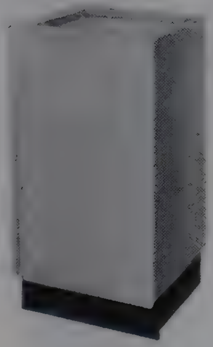
HEIGHTS OF UNITS

2 ft 11 in for assembly types A, E and F

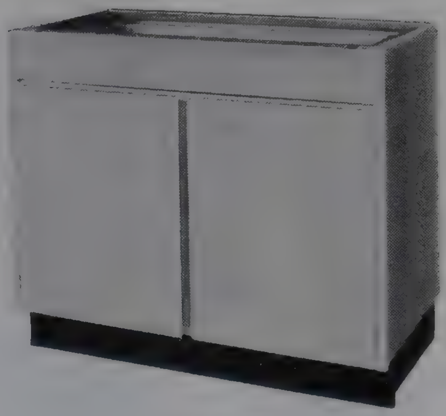
2 ft 8 in for assembly types B, C and D

CUPBOARD AND DRAWER UNIT, 1 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
FU-521	501	Oak or Mahogany	£ **19·00**	*f*
FU-522	502	Oak or Mahogany	**18·00**	*f*
FU-524	504	Oak or Mahogany	**16·00**	*f*
FU-525	505	Plastics faced	**23·00**	*f*



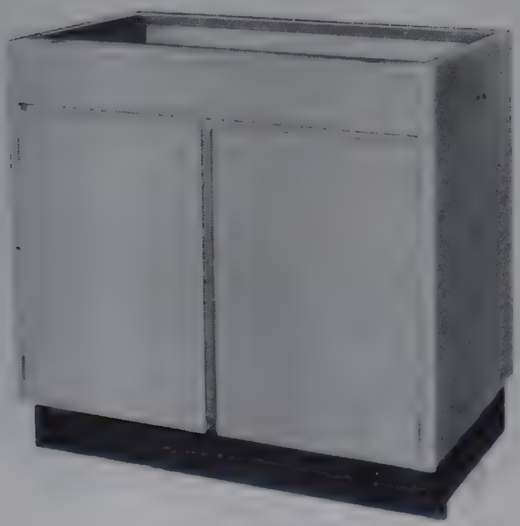
FU-521



FU-531

CUPBOARD AND SINGLE DRAWER UNIT, 3 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
FU-531	501	Oak or Mahogany	£ **31·00**	*f*
FU-532	502	Oak or Mahogany	**26·00**	*f*
FU-534	504	Oak or Mahogany	**24·00**	*f*
FU-535	505	Plastics faced	**36·00**	*f*



FU-541

CUPBOARD UNIT, 3 ft wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
FU-541	501	Oak or Mahogany	£ **26·00**	*f*
FU-542	502	Oak or Mahogany	**23·00**	*f*
FU-544	504	Oak or Mahogany	**20·00**	*f*
FU-545	505	Plastics faced	**30·00**	*f*

When ordering please specify List No., assembly type letter (see pages 294/295) and where applicable whether oak or mahogany preferred.

Gallenkamp STANDARD BENCH UNITS

NOTE: Prices given below are exclusive of bench tops and do not include Purchase Tax.
For suitable bench tops see page 305.

CUPBOARD UNIT, 1 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-551	501	Oak or Mahogany	19·00	*f*
FU-552	502	Oak or Mahogany	18·50	*f*
FU-554	504	Oak or Mahogany	15·50	*f*
FU-555	505	Plastics faced	22·00	*f*

FU-561

CUPBOARD UNIT, 3 ft wide × 1 ft 9 in deep.
With low back to accommodate services.

List No.	Range	Finish	Each	
			£	
FU-561	501	Oak or Mahogany	26·00	*f*
FU-562	502	Oak or Mahogany	23·00	*f*
FU-564	504	Oak or Mahogany	20·00	*f*
FU-565	505	Plastics faced	30·00	*f*

HEIGHTS OF UNITS

2 ft 11 in for assembly types A, E and F
2 ft 8 in for assembly types B, C and D

CUPBOARD UNIT, 1 ft 6 in wide × 1 ft 9 in deep × 2 ft 11 in high.
With low back to accommodate services.

List No.	Range	Finish	Each	
			£	
FU-571	501	Oak or Mahogany	19·00	*f*
FU-572	502	Oak or Mahogany	17·50	*f*
FU-574	504	Oak or Mahogany	15·50	*f*
FU-575	505	Plastics faced	22·00	*f*

FU-551

FU-571

CUPBOARD UNIT, 3 ft 6 in wide × 1 ft 9 in deep.
With low back to accommodate services.

List No.	Range	Finish	Each	
			£	
FU-581	501	Oak or Mahogany	29·00	*f*
FU-582	502	Oak or Mahogany	25·50	*f*
FU-584	504	Oak or Mahogany	23·00	*f*
FU-585	505	Plastics faced	33·00	*f*

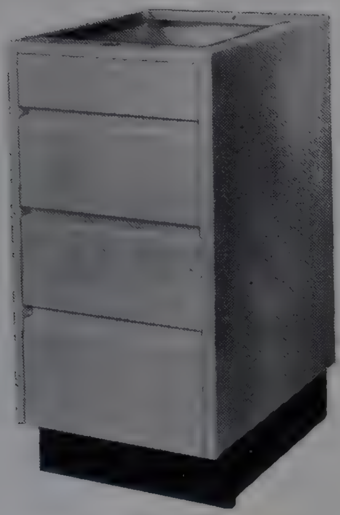
When ordering please specify List No., assembly type letter (see pages 294/295) and where applicable whether oak or mahogany preferred.

FU-581

Gallenkamp STANDARD BENCH UNITS

FU-591

HEIGHTS OF UNITS
2 ft 11 in for assembly types A, E and F
2 ft 8 in for assembly types B, C and D



FU-601

FU-611

FU-621

NOTE: Prices given below are exclusive of bench tops and do not include Purchase Tax.

For suitable bench tops see page 305.

NEST OF FIVE DRAWERS UNIT, 3 ft wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-591	501	Oak or Mahogany	**38·50**	*f*
FU-592	502	Oak or Mahogany	**34·00**	*f*
FU-594	504	Oak or Mahogany	**29·00**	*f*
FU-595	505	Plastics faced	**45·00**	*f*

NEST OF FOUR DRAWERS UNIT, 1 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-601	501	Oak or Mahogany	**28·00**	*f*
FU-602	502	Oak or Mahogany	**25·00**	*f*
FU-604	504	Oak or Mahogany	**22·00**	*f*
FU-605	505	Plastics faced	**32·00**	*f*

NEST OF TWENTY-FOUR SMALL DRAWERS UNIT, 3 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-611	501	Oak or Mahogany	**65·00**	*f*
FU-612	502	Oak or Mahogany	**64·00**	*f*
FU-614	504	Oak or Mahogany	**61·00**	*f*
FU-615	505	Plastics faced (20 drawers only)	**67·00**	*f*

KNEEHOLE TWO DRAWER UNIT, 3 ft wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-621	501	Oak or Mahogany	**12·00**	*f*
FU-622	502	Oak or Mahogany	**11·00**	*f*
FU-624	504	Oak or Mahogany	**10·50**	*f*
FU-625	505	Plastics faced	**12·50**	*f*

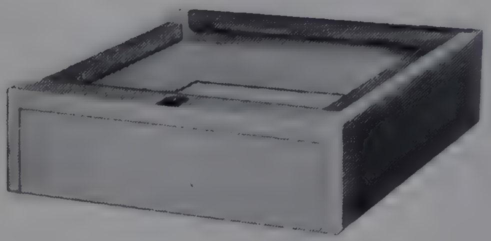
When ordering please specify List No., assembly type letter (see pages 294/295) and where applicable whether oak or mahogany preferred.

Gallenkamp STANDARD BENCH UNITS

NOTE: Prices given below are exclusive of bench tops and do not include Purchase Tax.
For suitable bench tops see page 305.

KNEEHOLE DRAWER UNIT, 1 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
FU-631	501	Oak or Mahogany	£ 6·75	f
FU-632	502	Oak or Mahogany	6·75	f
FU-634	504	Oak or Mahogany	6·50	f
FU-635	505	Plastics faced	7·00	f


FU-631

FU-641

KNEEHOLE RAIL, maximum width 4 ft.

List No.	Range	Finish	Foot run	
FU-641	501	Oak or Mahogany	£ 1·60	f
FU-642	502	Oak or Mahogany	1·60	f
FU-644	504	Oak or Mahagony	1·60	f
FU-645	505	Mahogany	1·60	f

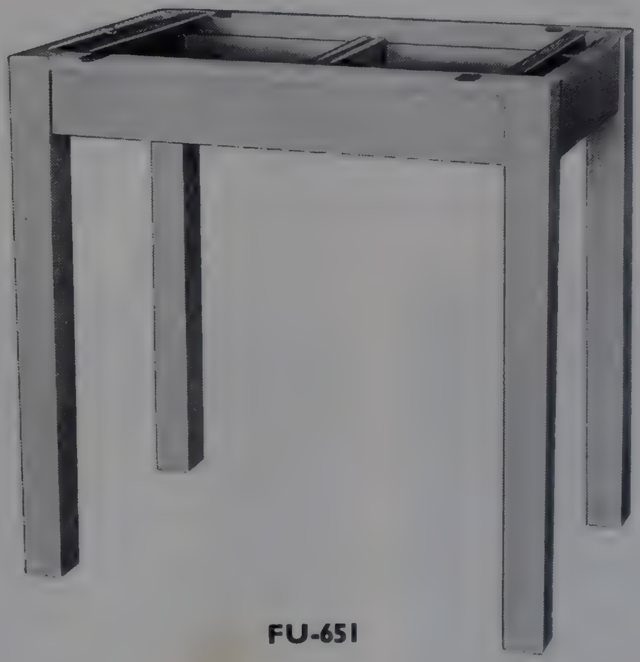

FU-651

TABLE AND TWO DRAWER UNIT, 3 ft wide × 1 ft 9 in deep

List No.	Range	Finish	Each	
FU-651	501	Oak or Mahogany	£ 18·00	f
FU-652	502	Oak or Mahogany	18·00	f
FU-654	504	Oak or Mahogany	18·00	f
FU-655	505	Mahogany	19·00	f

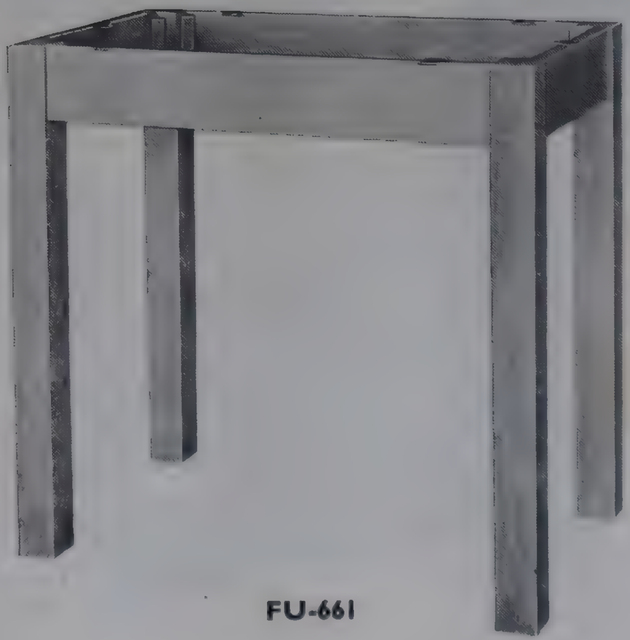
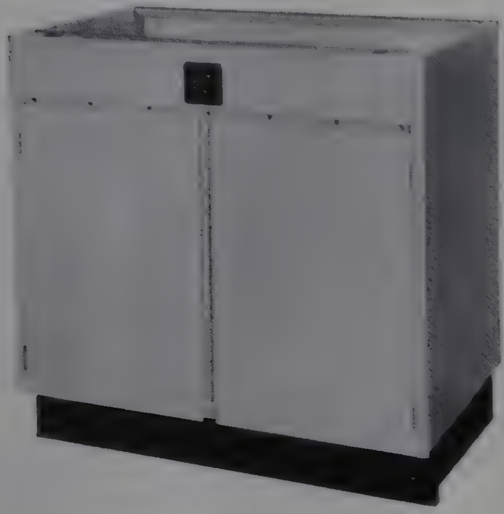

FU-661

TABLE UNIT, 3 ft wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
FU-661	501	Oak or Mahogany	£ 12·00	f
FU-662	502	Oak or Mahogany	12·00	f
FU-664	504	Oak or Mahogany	12·00	f
FU-665	505	Mahogany	12·00	f

When ordering please specify List No., assembly type letter (see pages 294/295) and where applicable whether oak or mahogany preferred.

Gallenkamp STANDARD BENCH UNITS



FU-681

NOTE: Prices given below are exclusive of bench tops and do not include Purchase Tax.

For suitable bench tops see page 305.

DRYING CUPBOARD UNIT, 1 ft 6 in wide × 1 ft 9 in deep.

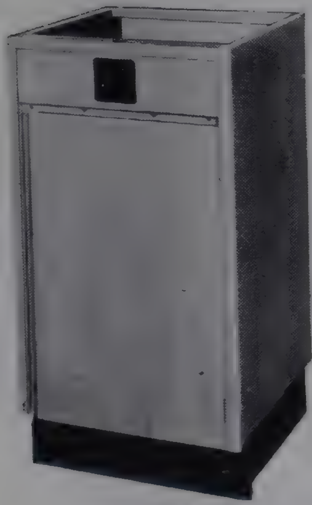
List No.	Range	Finish	Each	
			£	
FU-671	501	Oak or Mahogany	43·00	f
FU-672	502	Oak or Mahogany	43·00	f
FU-674	504	Oak or Mahogany	43·00	f
FU-675	505	Plastics faced	48·00	f

HEIGHTS OF UNITS

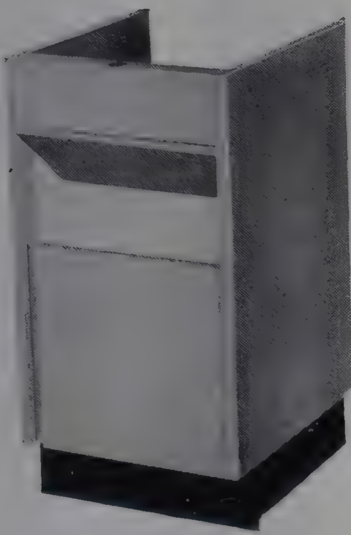
2 ft 11 in for assembly types A, E and F
2 ft 8 in for assembly types B, C and D

DRYING CUPBOARD UNIT, 3 ft wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-681	501	Oak or Mahogany	52·00	f
FU-682	502	Oak or Mahogany	52·00	f
FU-684	504	Oak or Mahogany	52·00	f
FU-685	505	Plastics faced	58·00	f



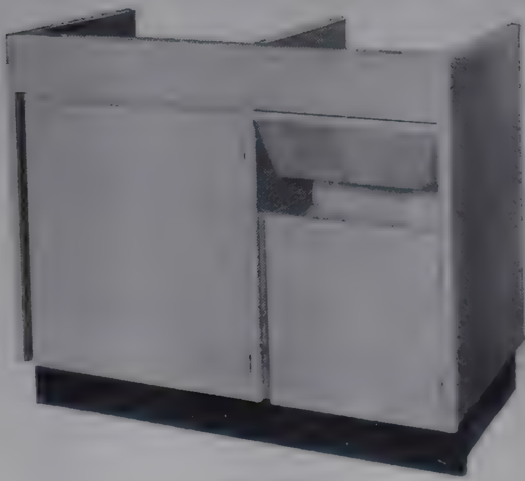
FU-671



FU-691

WASTE BOX UNIT, 1 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-691	501	Oak or Mahogany	22·00	f
FU-692	502	Oak or Mahogany	21·00	f
FU-694	504	Oak or Mahogany	18·00	f
FU-695	505	Plastics faced	24·00	f



FU-701

COMBINED CUPBOARD AND WASTE BOX UNIT
3 ft 6 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-701	501	Oak or Mahogany	39·00	f
FU-702	502	Oak or Mahogany	37·00	f
FU-704	504	Oak or Mahogany	33·00	f
FU-705	505	Plastics faced	45·00	f

When ordering please state List No., assembly type letter (see pages 294/295) and where applicable whether oak or mahogany required.

Gallenkamp STANDARD BENCH UNITS

NOTE: Prices given below are exclusive of bench tops and do not include Purchase Tax.
For suitable bench tops see page 305.

CORNER CUPBOARD UNIT, 1 ft 2 in wide × 1 ft 9 in deep.

List No.	Range	Finish	Each	
			£	
FU-711	501	Oak or Mahogany	30·00	f
FU-712	502	Oak or Mahogany	22·00	f
FU-714	504	Oak or Mahogany	21·00	f
FU-715	505	Plastics faced	30·00	f

CORNER DOOR UNIT, 1 ft 2 in wide.

List No.	Range	Finish	Each	
			£	
FU-721	501	Oak or Mahogany	8·00	f
FU-722	502	Oak or Mahogany	7·00	f
FU-724	504	Oak or Mahogany	6·75	f
FU-725	505	Plastics faced	8·00	f

FRAMED DOOR UNIT, 3 ft wide.

List No.	Range	Finish	Each	
			£	
FU-731	501	Oak or Mahogany	14·00	f
FU-732	502	Oak or Mahogany	13·00	f
FU-734	504	Oak or Mahogany	13·00	f
FU-735	505	Plastics faced	14·00	f

FRAMED DOOR UNIT, 1 ft 6 in wide.

List No.	Range	Finish	Each	
			£	
FU-741	501	Oak or Mahogany	9·00	f
FU-742	502	Oak or Mahogany	8·00	f
FU-744	504	Oak or Mahogany	8·00	f
FU-745	505	Plastics faced	9·00	f

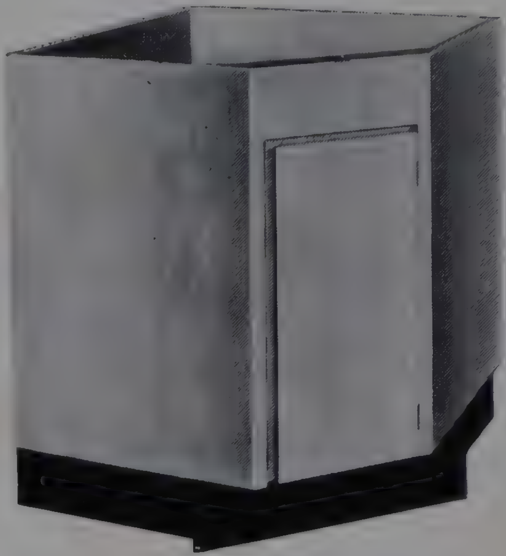
END SERVICE PANEL, wall type, 5 in wide.

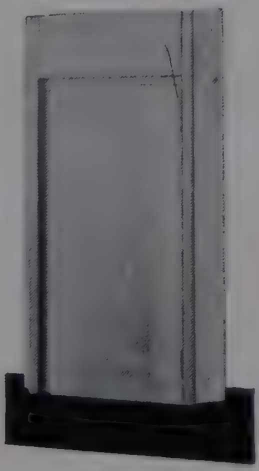
List No.	Range	Finish	Each	
			£	
FU-751	501	Oak or Mahogany	2·00	f
FU-752	502	Oak or Mahogany	2·00	f
FU-754	504	Oak or Mahogany	2·00	f
FU-755	505	Mahogany faced	2·00	f

END SERVICE PANEL, island type, 10 in wide.

List No.	Range	Finish	Each	
			£	
FU-761	501	Oak or Mahogany	2·50	f
FU-762	502	Oak or Mahogany	2·50	f
FU-764	504	Oak or Mahogany	2·50	f
FU-765	505	Mahogany faced	2·50	f

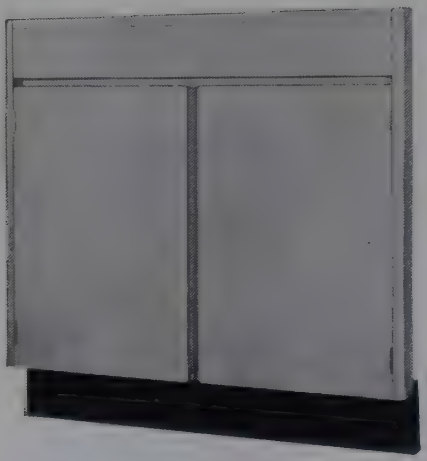
When ordering please specify List No., assembly type letter (see pages 294/295) and where applicable whether oak or mahogany preferred.


FU-711


FU-721

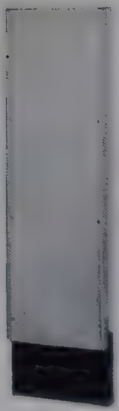
HEIGHTS OF UNITS

2 ft 11 in for assembly types A, E and F
2 ft 8 in for assembly types B, C and D


FU-731

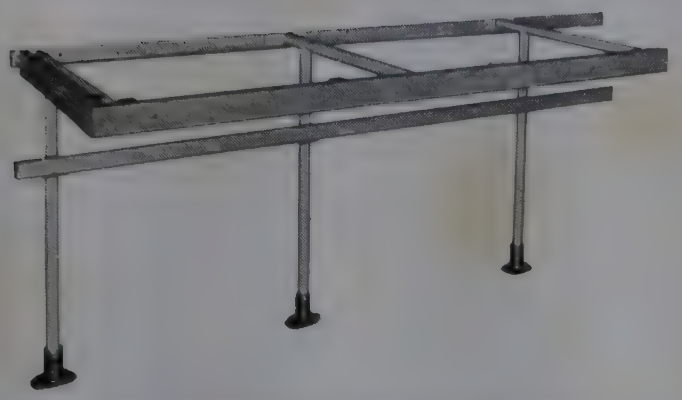
FU-741

FU-751

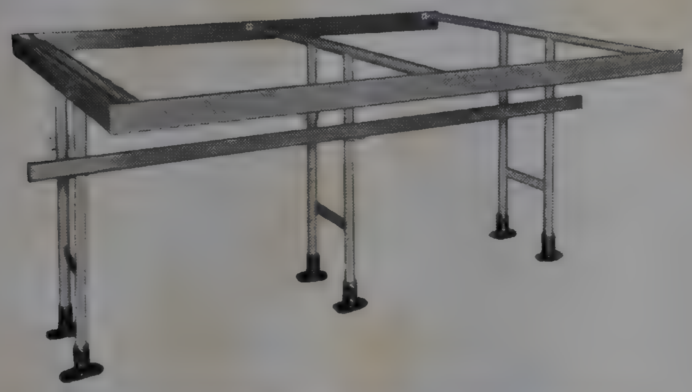

FU-761

Gallenkamp BENCH SUPPORT FRAMES

For use with movable bench assemblies types C and D



Frame support in typical wall assembly



Frame support in typical island assembly

FU-800
WALL BENCH CANTILEVER FRAME SUPPORT, where both floor and wall fixings are available, 2 ft 4 in deep × 2 ft 11 in high, finished in epoxy paint. Each £6·00 f

FU-801
WALL BENCH CANTILEVER FRAME SUPPORT, where floor fixing only is possible and for single sided island and peninsular benches, 2 ft 4 in deep × 2 ft 11 in high, finished in epoxy paint ... ... Each £7·00 f

FU-802
ISLAND BENCH CANTILEVER FRAME SUPPORT, doublesided, 4 ft 8 in deep × 2 ft 11 in high, finished in epoxy paint ... ... Each £9·00 f

FU-803
DASH RAIL, oak or mahogany, 2¾ in high. Foot run £0·25 f

FU-804
LAY-BOARD, for waste pipes, deal, unpolished. Foot run £0·13 f

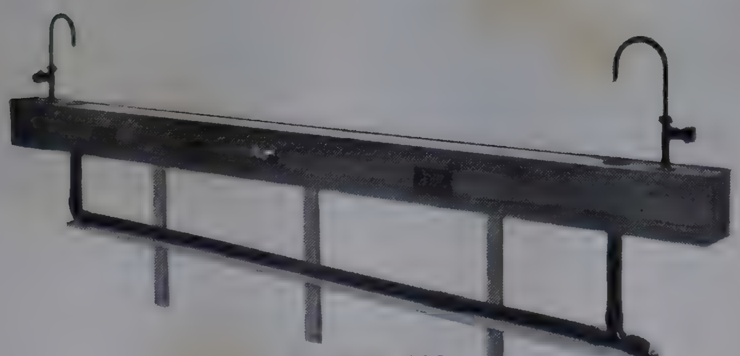
FU-805
WALL BATTEN, 2 × 1 in deal. Foot run £0·13 f

FU-806
BUTTING RAIL, for carcase units, 1 × ½ in oak or mahogany ... ... Foot run £0·13 f

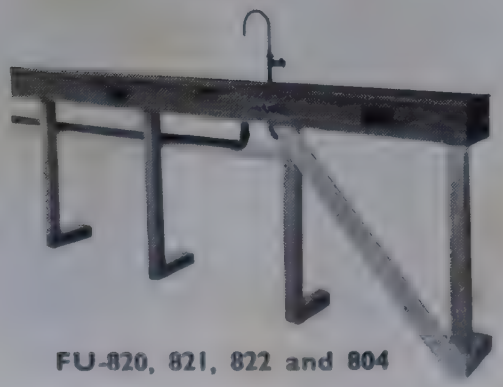
FU-807
PANELLING, oak or mahogany veneered plywood to contain plumbing and form return ends. Manufactured to required sizes. Price on application f

Gallenkamp SERVICE FRAMES

For use with movable bench assemblies types E and F



FU-815, 816 and 804



FU-820, 821, 822 and 804

NOTE: Prices given below do not include service fittings and pipes.

FOR WALL BENCHES

FU-815
SERVICE BOX, teak, 5 in deep × 7 in high. Foot run £2·00 f

FU-816
WALL BATTEN, with fixing block for service box. Each £0·80 f

FU-804
LAY-BOARD, for waste pipes. For price see entry in List No. sequence.

FOR ISLAND BENCHES

FU-820
SERVICE BOX, teak, 10 in deep × 7 in high. Foot run £3·75 f

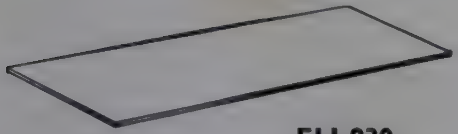
FU-821
LEG SUPPORT, for floor fixing ... Each £4·75 f

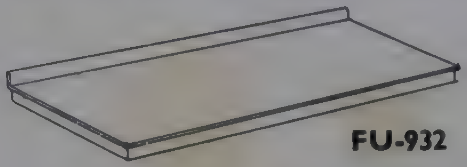
FU-804
LAY-BOARD, for waste pipes. For price see entry in List No. sequence.

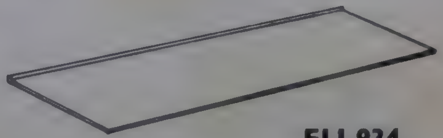
FU-822
DIAGONAL BRACE, for leg support. Foot run £0·25 f

BENCH TOPS

Bench tops can be supplied to suit all purposes. Those in common use are listed. Tops may however be prepared from other materials, and we will gladly assist in selection if desired.


FU-930


FU-932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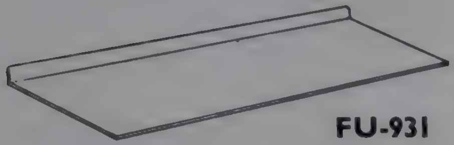
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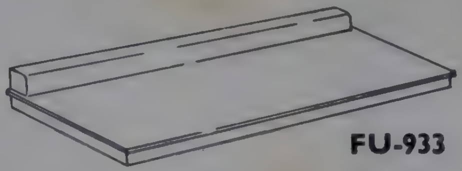
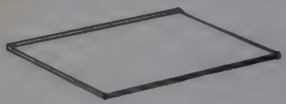

FU-933


FU-935

MATERIALS

TEAK. Moulmein, 1⅛ in thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

IROKO. 1⅛ in thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

AFRORMOSIA. 1⅛ in thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

ARBORITE. ¾ in thick. Edges as cut.

FORMICA. Mounted on 1 in thick blockboard and lipped on exposed edges with teak. The standard colour finish is grey linette, but alternatives will be quoted on request. Balancer on reverse.

STAINLESS STEEL. 18 gauge, FDP quality, mounted on a deal batten frame and turned down on edges.

PVC. ¼ in thick, set on ¾ in blockboard. Exposed edges are lipped with teak.

ANCILLARY FITTINGS

HEADING JOINTS. Moulmein teak, Afrormosia and Iroko tops. These are required where the bench run exceeds 8 ft and are tongued, grooved and bolted. Other tops are made in a single section if possible, but if joints are necessary they are arranged to suit circumstances.

SINK HOLES. Where formed in timber tops, are provided with throatings under the edges.

WALL SKIRTING. 4 in high × ⅝ in thick. Moulmein teak.

	Specifications of tops for wall benches. Island bench tops are generally twice as deep, but otherwise similar. As an approximate guide to price, those listed should be doubled.	Approximate prices for 1 ft run of bench top							
		Teak	Iroko	Afrormosia	Formica	Stainless steel	Arborite	PVC	
FU-930	**TOP,** for types A and B benches, 2 ft 3 in deep.	£ 4·75	£ 3·40	£ 3·90	£ 4·90	Prices on application			f
FU-931	**TOP,** for types A and B benches, 2 ft 3 in deep, fitted with skirting.	5·25	3·90	4·50	5·50				f
FU-932	**TOP,** for type C benches, fitted with skirting and front dash rail FU-803. 2 ft 6 in deep.	5·90	4·75	5·50	6·25				f
FU-933	**TOP,** for type D bench, fitted with teak service box and front dash rail FU-803. 2 ft 6 in deep overall.	7·40	5·70	6·50	7·90				f
FU-934	**TOP,** for type E bench, fitted with quadrant at rear. 2 ft 1 in deep.	4·70	3·40	3·90	4·90				f
FU-935	**UNIT TOP,** for type F bench, fitted with quadrant at rear, 3 ft wide × 2 ft 1 in deep. Each	14·00	10·25	11·75	14·75				f
FU-935	Ditto but 3 ft 6 in wide. Each	17·00	12·00	13·70	17·10				f
FU-936	**SKIRTING,** per ft run.	0·50	—	—	—				f
FU-937	**DRAINING BOARD** grooves cut into bench top. Each board, approx. 1 ft 6 in wide.	1·90	1·90	—	—	—	—	—	f
FU-938	**HEADING JOINT** Each	2·50	2·50	2·50	—	—	—	—	f
FU-939	**SINK HOLES** Each	1·90	—	—	—				f

REAGENT BOTTLE SHELVES

For mounting on bench tops, constructed throughout in oak or mahogany and having white Technolite strips, ¼ in thick laid on the shelves to facilitate cleaning.

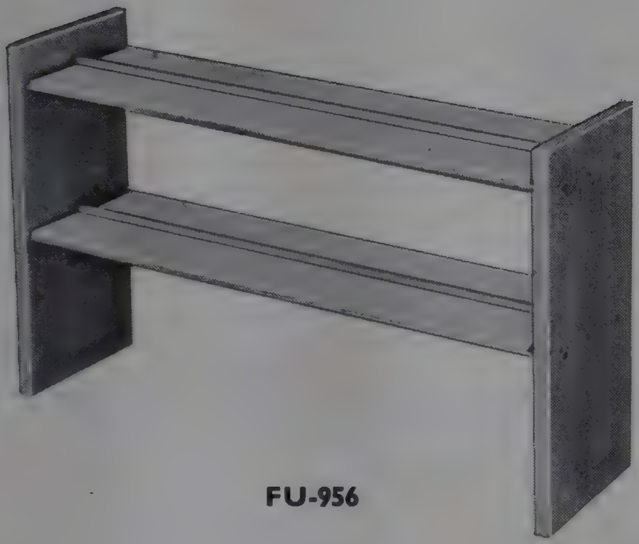
FU-951

FOR WALL BENCHES

Shelves are 4½ in deep × 1 ft 9 in high overall giving 9 in clear height between the bench top and the first shelf, and 8½ in clear between shelves.

FU-950
REAGENT BOTTLE SHELF, wall fitting, 1 ft 6 in wide, with two rectangular ends ... ... Each **£7·00** *f*

FU-951
REAGENT BOTTLE SHELF, wall fitting, 3 ft wide, with two rectangular ends ... ... Each **£10·75** *f*



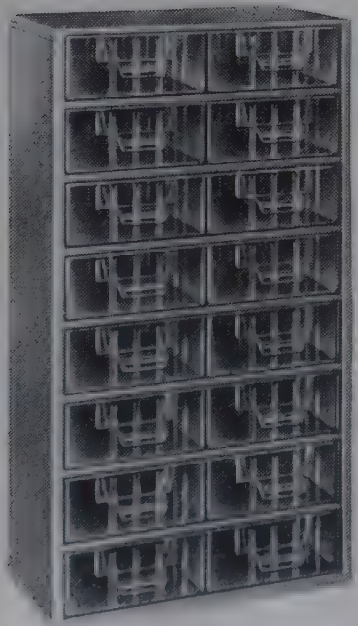
FU-956

FOR ISLAND BENCHES

Shelves are 9 in deep × 1 ft 9 in high overall and fitted with dividing beads at the centre of the shelves. The heights between shelves are identical with the wall type.

FU-955
REAGENT BOTTLE SHELF, island fitting, 1 ft 6 in wide, with two rectangular ends ... Each **£10·00** *f*

FU-956
REAGENT BOTTLE SHELF, island fitting, 3 ft wide, with two rectangular ends ... ... Each **£14·50** *f*



FV-261

STORAGE CABINETS

Robust enamelled steel cabinets with strong transparent plastics drawers for visible storage of small articles. Drawers have label holders and stop to prevent accidental over pulling.

List No.	No. of drawers		Size of drawers, cm H W D	Overall dimensions, cm H W D
***FV-260**	36		3·5 × 6·2 × 13·5	42 × 31 × 14·5
***FV-261**	16		5·7 × 13·5 × 13·5	56 × 31 × 14·5
***FV-263**	27	16	3·5 × 6·2 × 13·5	56 × 31 × 14·5
		6	5·7 × 8 × 13·5	
		2	5·7 × 13·5 × 13·5	
		2	8 × 13·5 × 13·5	
		1	5·7 × 28 × 13·5	

For prices see entries in List No. sequence.

REFRIGERATORS

For under bench fixing

FU-995

FU-995

REFRIGERATOR, *Electrolux*, 1 ft $8\frac{3}{8}$ in wide × 1 ft $9\frac{1}{4}$ in deep × 2 ft $6\frac{3}{4}$ in high. Suitable for fixing below a bench top of 3 ft working height. Internal volume 2·8 ft^3. Supplied with three shelves, freezing compartment, ice tray and door racks. Electrically operated. See Note below ... ... Each **£45·16** *f*

FU-998

REFRIGERATOR, *Electrolux*, 1 ft $6\frac{5}{8}$ in wide × 1 ft $7\frac{3}{8}$ in deep × 2 ft $4\frac{1}{16}$ in high. Suitable for fixing below bench tops as types B. C and D. Internal volume 1·6 ft^3. Supplied with two shelves, ice tray and door racks. Electrically operated. See Note below ... ... Each **£34·52** *f*

When ordering please state voltage and frequency of supply.

NOTE: FU-995 to FU-998 are supplied finished in either white or cream and with right or left-hand hinged doors. **When ordering please state preference.**

Other types of refrigerators, including free standing and low temperature models—see RJ-610 et seq. under REFRIGERATION.

Gallenkamp SINK UNITS

FV-124

FV-124

SINK UNIT, 3 ft 9 in × 2 ft 3 in × 3 ft high. Teak top FU-930, with a sink hole and draining grooves, set on combined cupboard and waste box unit FU-701, and 2 end panels FU-751. Splashback of white Technolite framed to peg draining rack FW-554. Sink 24 × 18 × 10 in FW-402, 1 plug FW-437, 2 water taps with standards. Oak finish. Each **£94·00** *f*

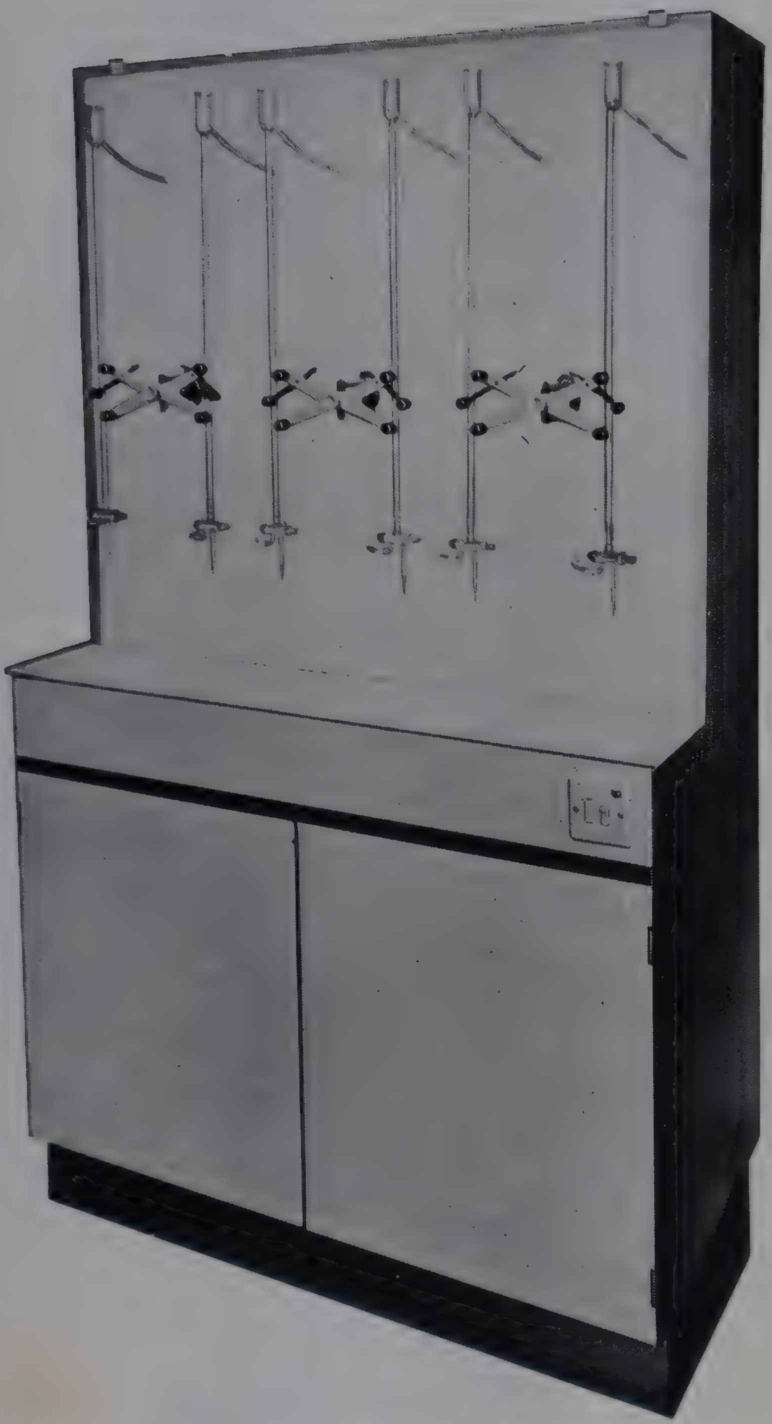
FV-126

FV-126

SINK UNIT, 6 ft × 2 ft 3 in × 3 ft high. Teak top FU-930, with a sink hole and draining grooves, set on a waste box unit FU-691, drying cupboard FU-671 with framed doors FU-731 in front of sink, and 2 end panels FU-751. Splashback of white Technolite framed between 2 peg racks FW-554. Sink 30 × 18 × 10 in. FW-402, 1 plug FW-437, 1 hot and cold water mixing tap, 1 water tap at high level for burette washing. Oak finish. Each **£138·00** *f*

FV-124 and FV-126 can be supplied with finish to match plastics faced range 505.

Gallenkamp TITRATION BENCHES



FV-153 with burettes BW-524
and glassware and fittings FV-159

PNEUMATIC FILLING

- Accommodates six automatic zero Class B burettes, each to deliver 50 cm³.
- Burette filling and titration controlled by turning single key.
- Shadowless, evenly illuminated, translucent viewing back and/or work top. Optional white Technolite provides opaque reflecting surface without internal lighting.
- Burette supply and overflow tubing concealed behind viewing back.
- Stock and waste bottles and air reservoir bottle contained in PVC tray within cupboard. Easy access for servicing. Illuminated back models also light cupboard interior.
- Built-in diaphragm pump provides filtered air at constant pressure, controlled by automatic relief valve.
- Door operated valve releases compressed air when cupboard is opened in order to guard against pressure accidents during servicing.

FV-150

TITRATION BENCH, auto zero, pneumatic filling, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high, with work top 3 ft 0 in high. White Technolite back and 8 in deep work top. Cupboard fitted with PVC tray to accommodate bottles. Ends of unit externally finished in mahogany with doors and fascia rail white plastics faced. Fitted with air pump AF-414 with inlet filter, controlled by fascia mounted switch. An air manifold, provided with pressure gauge and 2 valves for door operated release and pressure control, also has nozzles for connection by the user to air reservoir bottle and 6 stock bottles. Three double spring clamps SM-290 to accommodate 6 burettes are mounted on the viewing back. For 220/240V a.c. supplies.
Each **£120·00** *f*

FV-151

TITRATION BENCH, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high. As FV-150 but with translucent viewing back illuminated by daylight fluorescent tubes. The work top is of white Technolite ... ... Each **£142·00** *f*

FV-152

TITRATION BENCH, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high. As FV-150 but with translucent work top illuminated by daylight fluorescent tube. The viewing back is of white Technolite ... ... Each **£130·50** *f*

FV-153

TITRATION BENCH, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high. As FV-150 but with both viewing back and work top illuminated by daylight fluorescent tubes.
Each **£147·00** *f*

ACCESSORIES

FV-159	**Glassware and fittings,** comprising 13 bottles BT-172 2500 ml, glass tubes, neoprene stoppers, 30 metre coil vinyl tubing TX-772 5 mm bore and instructions for fitting ... ... Set **£10·00** *cS*
BW-524	**Burettes,** 50 cm³, with automatic zero and double oblique bore stopcock. For price and details see entry in List No. sequence.

NOTE:

Benches FV-150 to FV-153 each require but do not include six burettes BW-524 50 cm³ capacity and one set of glassware and fittings FV-159.
To ensure satisfactory operation FV-159 and the burettes should be ordered with the bench.

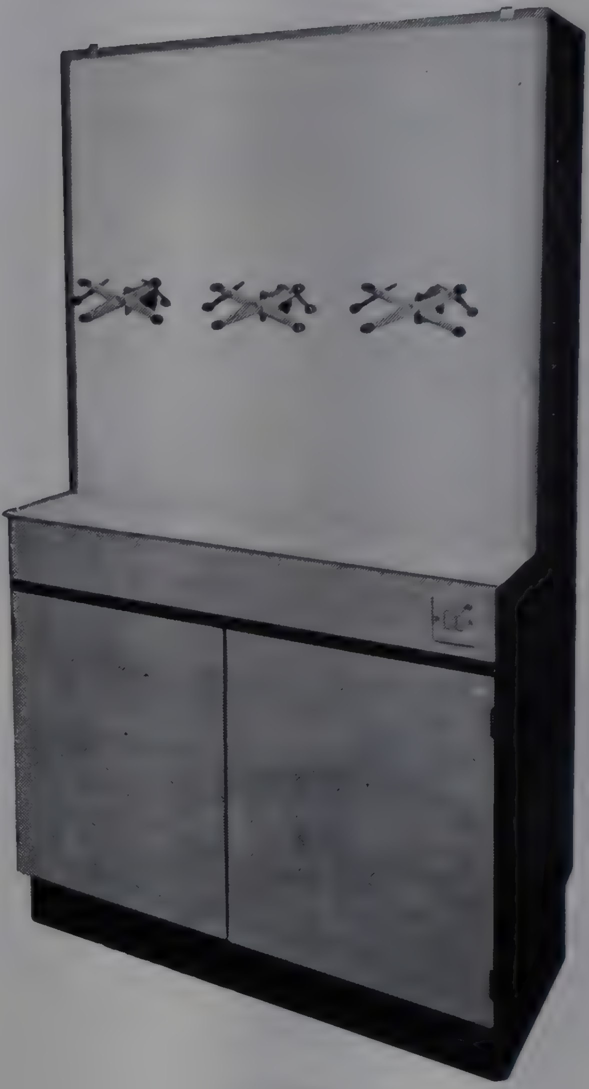
Gallenkamp TITRATION BENCHES

GRAVITY FILLING

- Accommodate six burettes Class A or B each to deliver 50 cm^3.
- Burette filling and titration controlled by turning single key.
- Shadowless, evenly illuminated, translucent viewing back and/or work top.
- Optional white Technolite provides opaque reflecting surface without internal lighting.
- Burette supply and overflow tubing concealed behind viewing back.
- Aspirator bottles mounted on shelf at top of viewing back.

FV-170

TITRATION BENCH, gravity filling, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high, with work top 3 ft 0 in high. White Technolite back and 8 in deep work top. Cupboard provided with timber floor and shelf. Ends of unit externally finished in mahogany with doors and fascia rail white plastics faced. White Technolite cover on roof of viewing back to accommodate aspirator bottles. Three double spring clamps SM-290 to accommodate 6 burettes are mounted on the viewing back ... Each **£84·00** *f*



FV-170

FV-171

TITRATION BENCH, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high. As FV-170 but with translucent viewing back illuminated by daylight fluorescent tubes. The work top is white Technolite ... ... Each **£107·50** *f*

FV-172

TITRATION BENCH, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high. As FV-170 but with translucent work top illuminated by daylight fluorescent tube. The viewing back is of white Technolite ... ... Each **£96·00** *f*

FV-173

TITRATION BENCH, 3 ft 6 in wide × 1 ft 9 in deep × 6 ft 2 in high. As FV-170 but with both viewing back and work top illuminated by daylight fluorescent tubes. Each **£112·50** *f*

ACCESSORIES

FV-175	Glassware and fittings, comprising 6 aspirator bottles AU-344 2000 ml and 8 metres vinyl tubing TX-772 5 mm bore	...Set **£22·25** *mS*
BW-134	Burette, 50 cm^3, Class B with double oblique bore stopcock	For details and prices see entries in List No. sequence.
BW-136	Burette, 50 cm^3, Class A with double oblique bore stopcock	

NOTE:

Benches FV-170 to FV-173 each require but do not include six burettes 50 cm^3 capacity, either BW-134 or BW-136, and one set of glassware and fittings FV-175.

To ensure satisfactory operation FV-175 and the burettes should be ordered with the bench.

VIEWING BACK UNITS

FV-180

VIEWING BACK UNIT. For wall or bench mounting, 3 ft 0 in wide × 9⅝ in deep × 3 ft 3¼ in high, with white Technolite back and roof cover. Timber frame of oak, externally polished to light shade. Fitted with two double spring clamps SM290 ... ... **£40·00** *f*

FV-181

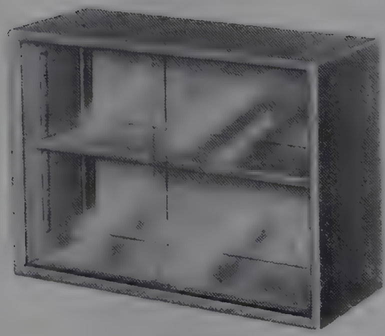
VIEWING BACK UNIT. For wall or bench mounting, 3 ft 0 in wide × 9⅝ in deep × 3 ft 3¼ in high, with translucent back illuminated by daylight fluorescent tubes controlled by switch mounted on left hand frame. Fitted with two double spring clamps SM-290. Roof cover of white Technolite. Timber frame of oak, externally polished to light shade ... ... Each **£64·50** *f*

FV-181

All items on this page coded S normally available from stock.

Gallenkamp APPARATUS CUPBOARDS

Units are of the stacking type. They can be assembled side by side, back to back, one on top of the other, and mounted on wall or floor


FV-201

FV-202

FV-205

FV-206

FV-207

NOTE: Prices given below do not include Purchase Tax.

FV-200

CUPBOARD UNIT, 3 ft wide × 1 ft 3 in deep × 2 ft high, fitted with one adjustable shelf. Enclosed by one pair of sliding oak faced doors. Suitable for wall fixing or mounting on plinth. Oak finish ... Each **£21·00** *f*

FV-201

CUPBOARD UNIT, 3 ft wide × 1 ft deep × 2 ft high, fitted with one adjustable shelf. Enclosed by one pair of sliding glass doors. Suitable for wall fixing or mounting on plinth. Oak finish ... ... Each **£21·00** *f*

FV-202

CUPBOARD UNIT, 3 ft wide × 1 ft 3 in deep × 3 ft high, fitted with two adjustable shelves. Enclosed by one pair of sliding oak faced doors. Suitable for wall fixing or mounting on plinth. Oak finish ... Each **£26·00** *f*

FV-203

CUPBOARD UNIT, 3 ft wide × 1 ft deep × 3 ft high, fitted with two adjustable shelves. Enclosed by one pair of sliding glass doors. Suitable for wall fixing or mounting on plinth. Oak finish ... ... Each **£26·00** *f*

FV-204

PLINTH, for floor mounted cupboard unit, mahogany, 3 ft wide × 2 in high ... ... Each **£1·65** *f*

FV-205

CUPBOARD ASSEMBLY, 6 ft wide × 1 ft 3 in deep × 3 ft 2 in high, comprising 2 units FV-202 mounted on a mahogany plinth FV-204. Oak finish ... Each **£53·65** *f*

FV-206

CUPBOARD ASSEMBLY, 6 ft wide × 1 ft deep × 3 ft high. Comprising 2 units FV-203 with 5 ft 10 in run oak batten to provide support on wall. Oak finish. Each **£52·00** *f*

FV-207

CUPBOARD ASSEMBLY, 3 ft wide × 1 ft 3 in deep × 7 ft 2 in high. Comprising 2 units FV-201 mounted on one unit FV-202 with plinth FV-204. Oak finish. Each **£69·65** *f*

If required all cupboards can be supplied in mahogany finish to match mahogany furniture, or plastics faced for 505 range. Prices on application.

Gallenkamp
PECO TRADE MARK

BALANCE TABLE

BD-200

BALANCE TABLE, to provide a working surface which is free from the vibrations inherent in buildings. Ideal for mounting analytical balances, galvanometers, optical levers and other vibration sensitive instruments. The table comprises a set of stone slabs and a set of sundries. The top member and two side members (which are drilled to accept the bracing bar) are of 3 in (8 cm) thick grey/green mottled terrazzo stone. The sundries comprise the bracing bar, washers and nuts, and a set of rubber shock-absorbing pads. Supplied with instructions for assembly.

Overall height 2 ft 6 in (76 cm).
Working surface 3 ft 0 in × 2 ft 6 in (90 × 76 cm).
Net weight 6 cwt (300 kg) approx.
For price see entry in List No. sequence.

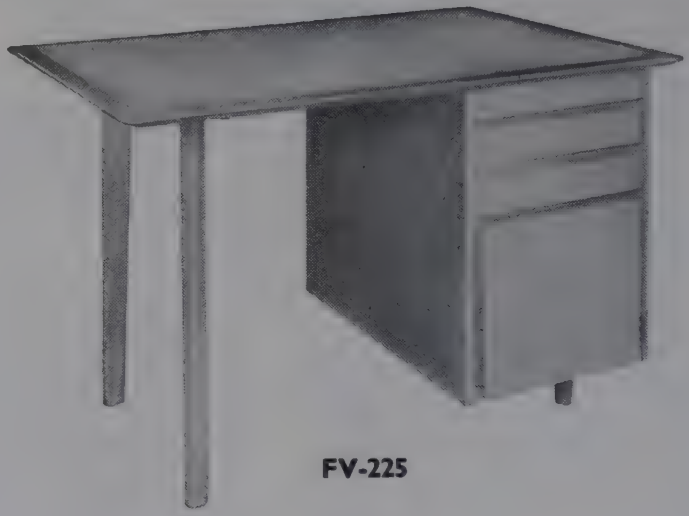
BD-200

LABORATORY DESKS

FV-225

DESK, 4 ft × 2 ft 8 in × 2 ft 6 in high. Linoleum top, edged with mahogany. Pedestal on right hand side has pull-out writing flap, two drawers and a cupboard.

Each **£52·00** *f*
+ Purchase Tax



FV-225

FV-226

DESK, 5 ft 9 in × 2 ft 8 in × 2 ft 6 in high. Linoleum top, edged with mahogany. Left hand pedestal contains one pull-out writing flap, one deep drawer and cupboard. Right hand pedestal has one pull-out writing flap, two shallow drawers and foolscap filing drawer. The top overlaps at one end, and there is a substantial knee recess in the back. These features permit several people to use the desk simultaneously for an informal meeting.

Each **£70·00** *f*
+ Purchase Tax

FV-226

LABORATORY STOOLS AND CHAIRS

FV-227

FV-228

FV-227

CHAIR, strong taper tube frame. Suitable for microscope and balance work. Seat height 19 in. Upholstered seat and back, covered green PVC ... Each **£6·50** *m*

FV-228

STOOLS, tubular steel, with 13 in dia. seat upholstered and covered green 'Vynide'. Grey stove enamelled finish.

Height	24	27 in	
Each	**£4·90**	**4·90**	*m*

FV-229

STOOLS, tubular steel, with 13 in dia. seat upholstered and covered green 'Vynide'. Chromium plated finish.

Height	24	27 in	
Each	**£7·50**	**7·50**	*m*

FV-230

FV-231

FV-235

FV-230

STOOLS, beech frame with hardwood seat, polished to match light oak.

Height	24	27 in	
Each	**£1·80** + Purchase Tax	**2·00** + Purchase Tax	*m*

FV-231

STOOLS, beech frame with padded seat covered with green 'Vynide'. Frame polished to match light oak.

Height	24	27 in	
Each	**£3·50** + Purchase Tax	**3·60** + Purchase Tax	*m*

FV-235

CHAIRS, tubular steel, enamelled light grey, with dark blue polypropylene seat and back.

Height	21	23	26	29 in	
Each	**£3·80**	**3·90**	**4·00**	**4·10**	*m*

FV-236

FV-238

FV-236

CHAIRS, aluminium base and black stem with grey polypropylene seat and back. Model 24½ in has footring. All models have 4½ in screw adjustment.

Height (min)	16	20	24½ in	
Each	**£6·00**	**9·25**	**9·75**	*m*

FV-238

ARMCHAIR, for desk, square section tubular steel with black matt finish. Upholstered seat and back covered in grey vinyl ... ... Each **£18·50** *mN*

Items on this page normally available from stock except those coded *N.*

APPARATUS RACKS AND CABINETS

FV-240

RACK, burette, 1 ft 6 in × 3 in × 10½ in high. Teak. Holds 8 × 50 cm^3 burettes. Fixed to wall by 2 mirror plates ... ... Each **£3·40** *c*

FV-241

RACK, pipette, 1 ft 6 in × 3 in × 10½ in high. Teak. Holds 14 × 10 cm^3 and 12 × 25 cm^3 pipettes. Fixed to wall by 2 mirror plates ... ... Each **£3·20** *c*

FV-242

RACK, thermometer, 1 ft 6 in × 3 in × 10½ in high. Teak. Holds 36 thermometers. Fixed to wall by 2 mirror plates ... ... Each **£3·20** *c*

FV-243

RACK, combined burette and pipette, 3 ft × 3 in × 10½ in high. Teak. Holds 8 × 50 cm^3 burettes, 14 × 10 cm^3 and 12 × 25 cm^3 pipettes. Fixed to wall by 2 mirror plates. Each **£5·40** *c*

FV-244

STAND, glass tubing, 2 ft 6 in × 6 in × 3 ft high. Oak, light polished, with divisions for 10 sizes of tubing. Each **£10·00** *c*

FV-245

CABINET, filter paper, 10¾ in × 9 in × 1 ft 1 in high. Oak, light polished, having interior divided to hold standard filter paper boxes. Fitted with hinged door. Each **£10·00** *c*

FV-246

CABINET for graduated glassware, 2 ft 2 in × 7 in × 3 ft 4 in high. Oak, light polished, with one pair of glazed hinged doors. Interior fitted with racks and clips. White Technolite draining plate in bottom. Each **£24·00** *m*

FV-247

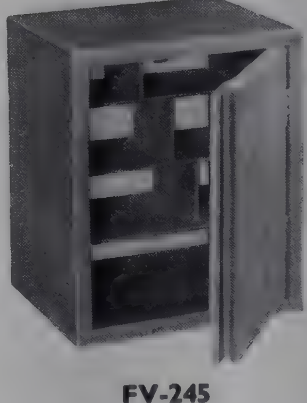
STAND, text book, oak, light polished, 1 ft 8 in wide × 7 in deep × 1 ft high ... ... Each **£2·60** *m*

FV-243

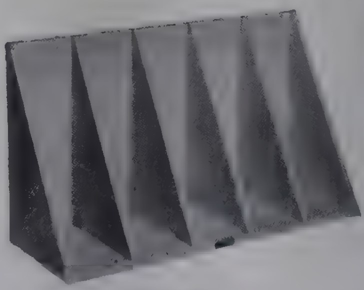
FV-240

FV-244

FV-241
FV-242


FV-245

FV-246


FV-247

All items on this page normally available from stock.

FV-250

FV-254

FV-256

FV-261

LABORATORY TROLLEYS

FV-250

TROLLEY, 3 ft wide × 1 ft 9 in deep × 2 ft 10 in high. Oak, light polished, having two shelves and fitted with our rubber tyred castors ... ... Each **£12·50** *m*
+ Purchase Tax

FV-251

TRAYS, 2 ft 8 in wide × 1 ft 6 in deep × 3 in high, oak, light polished, for use with trolley FV-250.
Each **£4·50** *m*
+ Purchase Tax

FV-254

TROLLEY, 2 ft 7½ in wide × 1 ft 5 in deep × 2 ft 7 in high, rigidly constructed of 16 swg rectangular steel tube. Suitable to meet the varied requirements of a laboratory, including the mounting and transport of portable vacuum pumps. Finished white epoxy stoved enamel and having two removable trays; fitted 4 in heavy duty rubber castors.
Each **£20·00** *m*

FV-255

TRAYS, spare, 24¼ in × 14¾ in with 1 in lip all round and two carrying handles, finished white epoxy stoved enamel, for use with trolley FV-254 ... ... Each **£3·00** *m*

FV-256

TROLLEY, 3 ft 6½ in wide × 1 ft 8 in deep × 3 ft high. Tubular steel construction, stove enamelled, and mounted on 4 in dia. rubber tyred castors. Fitted three removable grey plastics trays ... ... Each **£32·00** *mN*

VB-480

VACUUM TROLLEY, *Gallenkamp.* For details and price see entry in List No. sequence.

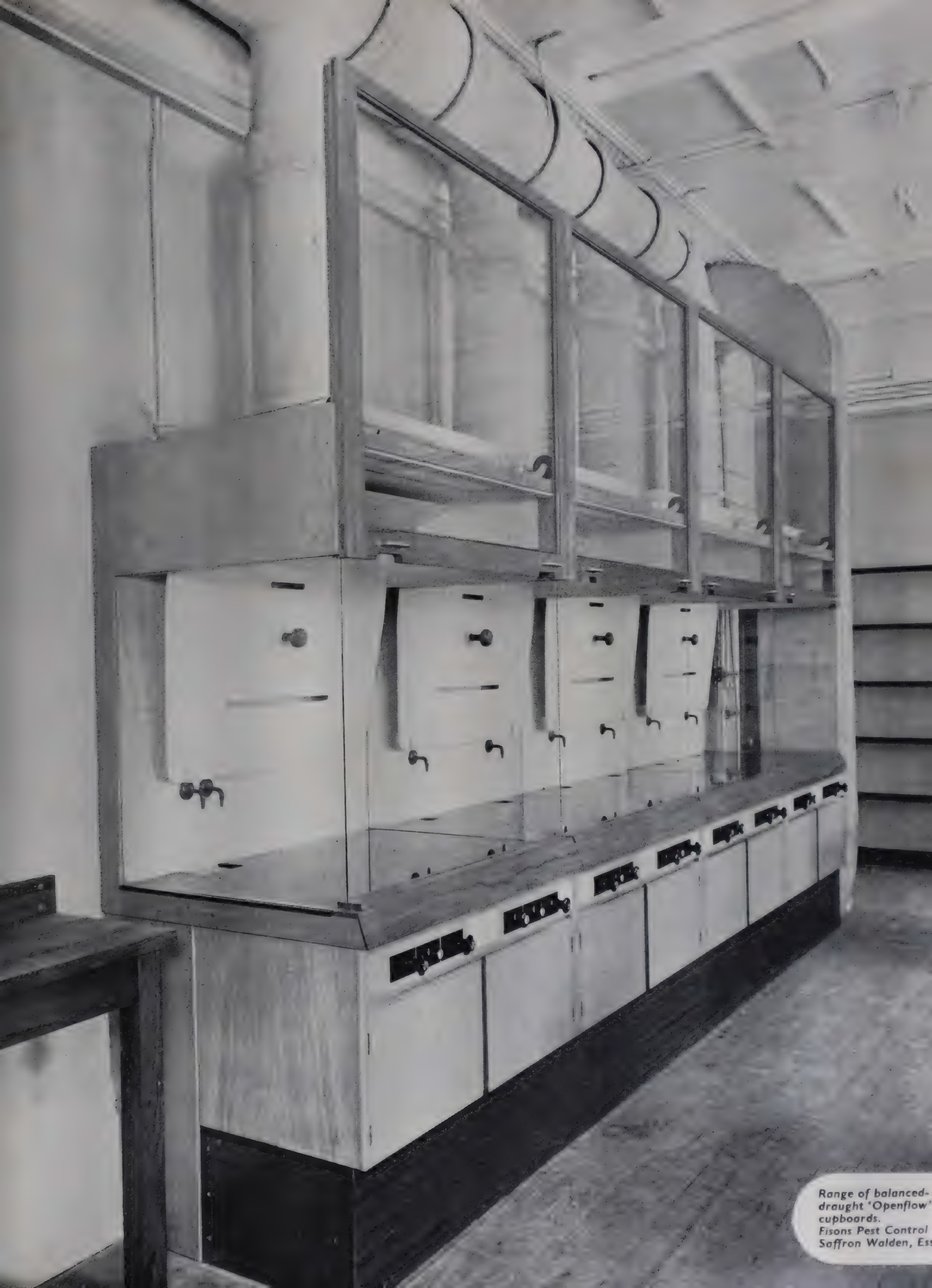
STORAGE CABINETS

Robust enamelled steel cabinets with strong transparent plastics drawers for visible storage of small articles. Drawers have label holders and stop to prevent accidental over pulling.

List No.	No. of drawers	Size of drawers, cm H W D	Overall dimensions, cm H W D	Each	
				£	
***FV-260**	36	3·5 × 6·2 × 13·5	42 × 31 × 14·5	**4·50**	*m*
***FV-261**	16	5·7 × 13·5 × 13·5	56 × 31 × 14·5	**5·40**	*m*
***FV-263**	27 { 16 6 2 2 1	3·5 × 6·2 × 13·5 5·7 × 8 × 13·5 5·7 × 13·5 × 13·5 8 × 13·5 × 13·5 5·7 × 28 × 13·5	56 × 31 × 14·5	**5·80**	*m*

Other sizes can be supplied. Prices on application.

Items on this page normally available from stock except those coded *N*.

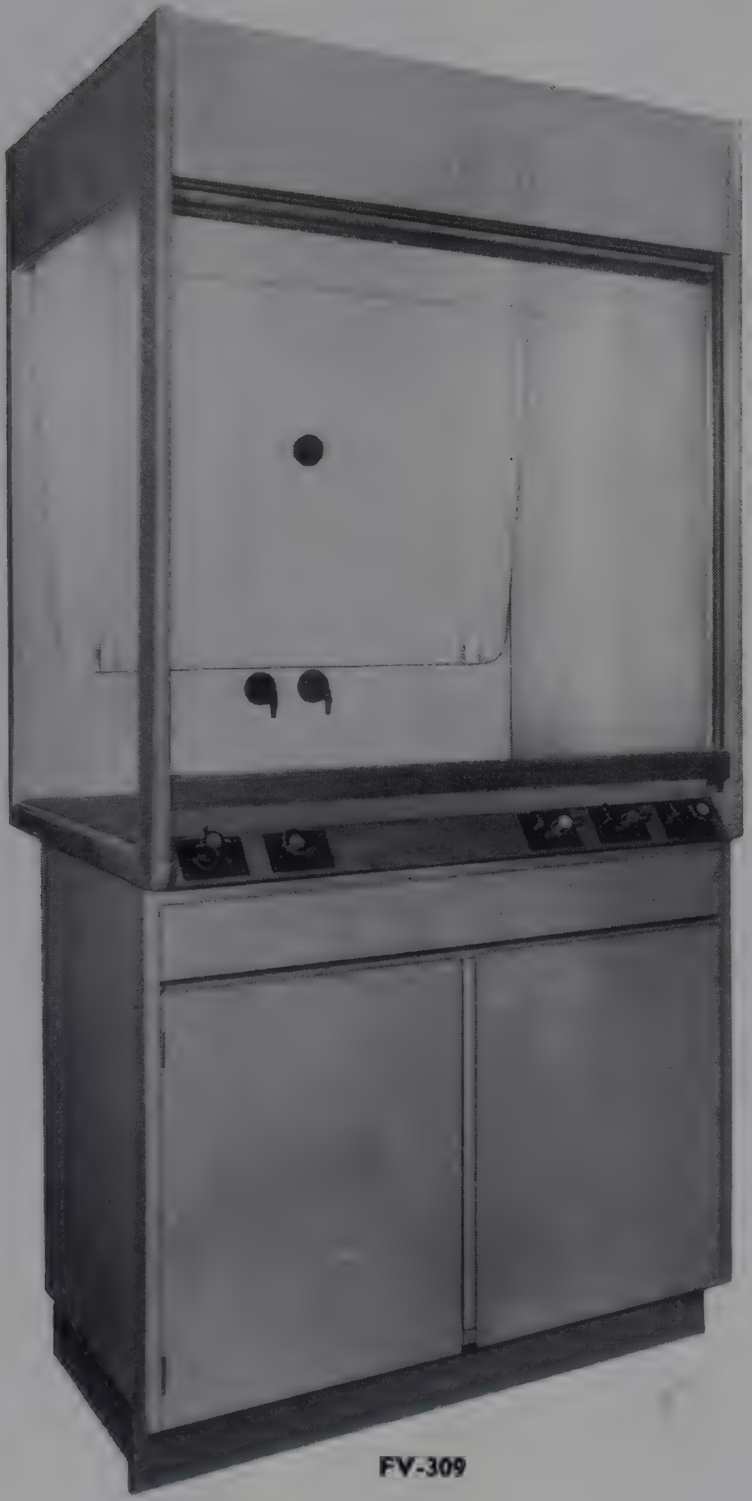


Range of balanced-draught 'Openflow'
cupboards.
Fisons Pest Control
Saffron Walden, Ess

Gallenkamp STANDARD FUME CUPBOARDS

REGD TRADE MARK

- Clean modern styling
- Multiple assemblies can be made up from any number of units
- Extract duct opening at top, to accommodate 5 in diameter pipe, unless otherwise specified
- Back and roof lined with protective coated asbestolite
- Narrow stiles give excellent view and access
- Sash and sides glazed for all-round visibility
- Inclined fascia improves air flow and mounts service taps
- Standard under-bench unit
- Adjustable baffle controls air flow distribution (This is an optional extra)
- Black Technoplate working top with front lip to protect operator from spillage



FV-309

Dimensions:

Width 3 ft 6 in. Depth 2 ft 6 in. Height 6 ft 11 in.
Height to working top 3 ft 1 in.
Height overall with sash fully raised 9 ft 0 in.

CONSTRUCTION

The carcase is oak framed, the sash frame and inclined fascia are of teak. Only a very small amount of these timbers is exposed inside the cupboard, thus practically eliminating fire and corrosion hazards.

COUNTERPOISED SASH

Runs on terylene lines.

STANDARD GLAZING

For sash and ends, 32 oz glass. The back and roof are lined with asbestolite, coated with polyurethane.

Alternative glazings and linings are available to meet special requirements. Details and prices on application.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the carcase unit.

OPEN SASH WORKING

When baffle FV-307 is fitted, the sash can be kept raised for many applications. If provided with protective glazing the sash can be regarded as a safety screen.

STANDARD EXTERNAL FINISH

Oak, light polished. Mahogany, for installations where mahogany and 505 plastics ranges are used.

ADDITIONAL LIGHTING

Top lighting may be achieved by means of a glazed panel let into the roof and in addition an electric light may be fitted to illuminate through this panel. Prices on application.

MODIFICATIONS to suit specialised needs

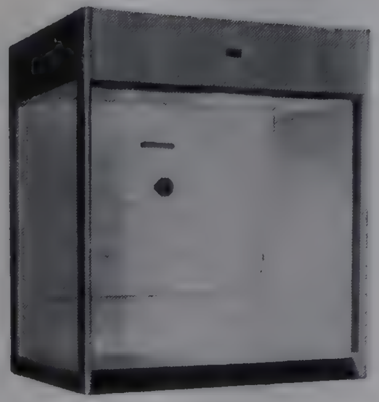
Top panels may be extended to ceiling height to enclose ductwork.

Air intake ducts can be fitted to reduce the extraction of conditioned air.

Gallenkamp STANDARD FUME CUPBOARDS

FV-300

FUME HOOD, standard, 3 ft 6 in wide × 2 ft 6 in deep × 4 ft high, for mounting on existing bench top or support. The hood has glazed ends with back and roof of protected asbestolite. Fitted with easily adjusted baffle FV-307 for distributed air flow. Working top of black Technoplate. No service fittings are included... ... Each **£86·00** *f*



FV-300

FV-301

FUME CUPBOARD, standard, 3 ft 6 in wide × 2 ft 6 in deep × 4 ft high, for mounting on existing bench top or support. Glazed counter-poised sash and ends with protected asbestolite back and roof. Working top of black Technoplate. No service fittings are included. Each **£72·50** *f*

ACCESSORY

FV-307 **Asbestolite baffle,** for fitting to standard fume cupboard FV-301, complete with teak operating handle and hinges. Specially coated for protection against corrosion. Readily dismantled for cleaning. Gives excellent control of air flow and may also be used to cut off the flow of air from any one cupboard in a multiple assembly. Each **£17·50** *f*

FV-309

FUME CUPBOARD, standard, 3 ft 6 in wide × 2 ft 6 in deep × 6 ft 11 in high. Comprises fume cupboard FV-301 with two glazed ends and glazed sash. Fitted with adjustable baffle FV-307. Working top of black Technoplate with hole cut for sink. Mounted on cupboard unit FU-581.

Services

1 panel mounting gas tap with integral nozzle FV-771, 1 water tap front control FV-779, 1 steam tap front control FV-780, 1 water bend FV-791, 1 steam bend FV-791, 1 panel mounting compressed air tap with integral nozzle FV-773, 1 panel mounting vacuum tap with integral nozzle FV-772, 1 sink FW-400 8 × 6 × 6 in, 1 plug FW-436 black polythene, 1 pair straps FW-401. Each **£144·00** *f*

FV-310

FV-310

FUME CUPBOARD, standard, 7 ft wide × 2 ft 6 in deep × 6 ft 11 in high. **Comprises 2 fume cupboards FV-301** with 2 glazed ends and glazed division between mounted on 2 cupboard units FU-581. Two end service panels as FU-751.

Services

4 panel mounting gas taps with integral nozzles FV-771, 2 water taps front control FV-779, 2 water bends FV-791, 2 sinks FW-400, 8 × 6 × 6 in, 2 plugs FW-436 black polythene, 2 pairs straps FW-401, 2 electrical double socket outlets 13 amp ... ... Each **£238·00** *f*

FV-311

FUME CUPBOARD, standard, 10 ft 6 in wide × 2 ft 6 in deep × 6 ft 11 in high. **Comprises 3 fume cupboards FV-301** having 2 glazed ends and 2 glazed centre divisions. Mounted on 3 cupboard units FU-581. Two end service panels as FU-751.

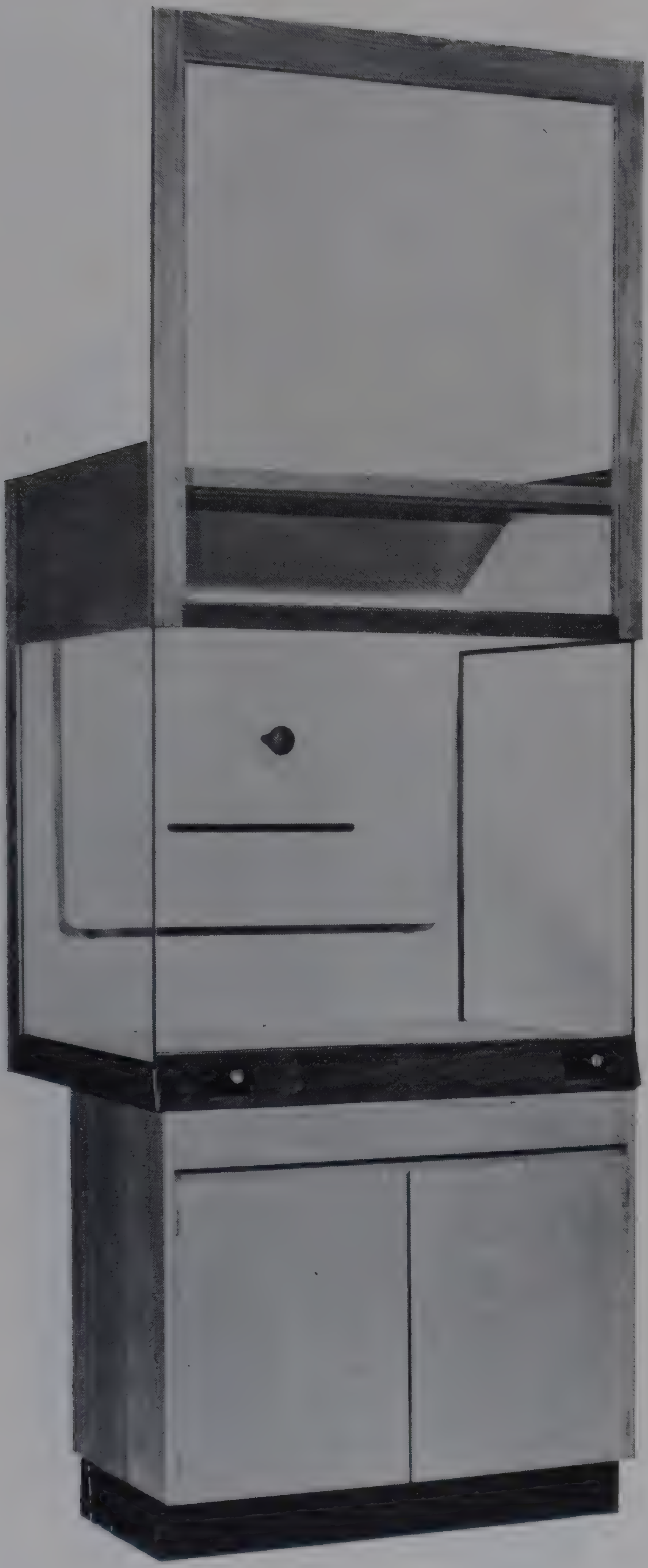
Services

4 panel mounting gas taps with integral nozzles FV-771, 2 water taps front control FV-779, 2 water bends FV-791, 2 sinks FW-400 8 × 6 × 6 in, 2 plugs FW-436, 2 pairs straps FW-401, 6 electrical switch sockets 13 amp, 3 switches for lighting ... ... Each **£395·00** *f*

FV-311

Any of the above fume cupboards may be mounted on a table underframe. Prices on application.

Gallenkamp 'OPENFLOW I' FUME CUPBOARDS



Dimensions:
Width 3 ft 8 in. Depth 2 ft 11 in. Height 7 ft 2 in.
Height to working top 3 ft 2½ in.
Height overall with sash fully raised 10 ft 0 in.

For open sash working. Alternative models provide controlled draught or balanced extraction.

- **Positive air flow ensures there are no eddies into room**
- **Controlled draught unit uses minimum room-air**
- **Balanced extraction model conserves conditioned air in the laboratory, where necessary, by replacing calculated proportion of extraction with fresh air inducted from outside building**
- **Armoured glass sashes are used as safety screens—not to retain fumes inside cupboard**
- **One-hand adjustment baffles control air flow distribution**
- **No front stiles to impede access**
- **Removable ends (and divisions in multiple units) facilitate cleaning and decontamination**
- **Full width open bench top in range of cupboards when divisions are removed**
- **Corrosion resistant interior of armoured glass and protected asbestolite. Alternative materials available**
- **Exterior facings of melamine plastics, oak (illustrated), mahogany or teak, to match all bench ranges**

CONSTRUCTION

The carcase is cantilever framed in oak, the sash frame and inclined fascia being of teak. Only a very small amount of these timbers is exposed inside the cupboard, thus practically eliminating fire and corrosion hazards. The counterpoised sash runs on terylene lines.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the carcase unit.

ADDITIONAL LIGHTING

Top lighting may be achieved by means of a glazed panel let into the roof and in addition an electric light may be fitted to illuminate through this panel. Price on application.

FIXING

These fume cupboards are self-supporting, but light wall fixing at the top is essential. Wherever possible we recommend that our installation engineers erect cupboards and extraction/induction plant.

Multiple units may need overhead guide runners to facilitate even operation of the sashes.

Gallenkamp 'OPENFLOW I' FUME CUPBOARDS

FV-312

FUME CUPBOARD, *Openflow I*, 3 ft 8 in wide × 2 ft 11 in deep × 4 ft 3 in high for mounting on existing bench top or table underframe. All glazing in toughened glass with side panels removable. Working top of black Technoplate with back and roof of protected asbestolite. The cupboard is fitted with adjustable baffle FV-307.

This cupboard is arranged for controlled draught only.

Services
2 panel mounting gas taps with integral nozzles.
Each **£156·00** *f*

FV-312

FV-313

FUME CUPBOARD, *Openflow I*, 3 ft 8 in wide × 2 ft 11 in deep × 7 ft 2 in high. Comprises fume cupboard FV-312 set on cupboard unit as FU-581. Working top of black Technoplate. Two end service panels as FU-751. The cupboard is fitted with adjustable baffle FV-307.

This unit is arranged for controlled draught only.

Services
2 panel mounting gas taps with integral nozzles.
Each **£192·00** *f*

FV-312 and FV-313 can be equipped for balanced extraction working. Details and prices on application.

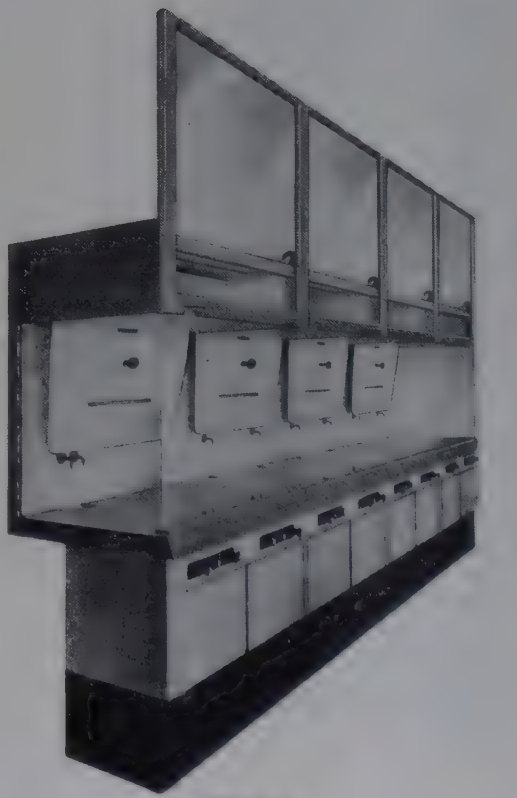
FV-313

FV-314

FUME CUPBOARD, *Openflow I*, 14 ft 2 in wide × 2 ft 11 in deep × 7 ft 2 in high. Comprises 4 fume cupboards FV-312 **arranged for balanced extraction,** set on 4 cupboard units as FU-581 arranged with a continuous plinth to form duct for balanced air intake. 2 end service panels as FU-751. Each section fitted with adjustable baffle FV-307. Working top of black Technoplate with 4 notches for sinks.

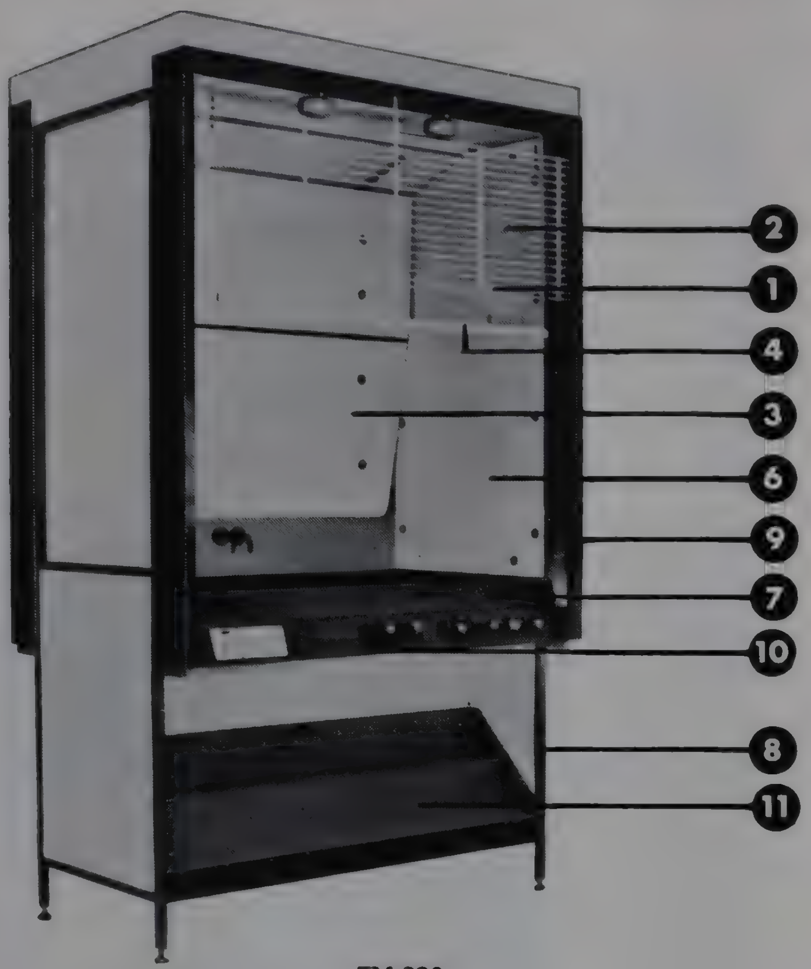
Services
4 sinks 8×6×6 in FW-400. 4 plugs FW-436. 8 water taps, front control FV-779 with bends FV-791. 8 panel mounting gas taps with integral nozzles FV-771. 4 panel mounting compressed air taps FV-773. 4 pairs sink straps FW-401 ... ... Each **£890·00** *f*

This cupboard can be supplied for controlled draught only. Details and prices on request.

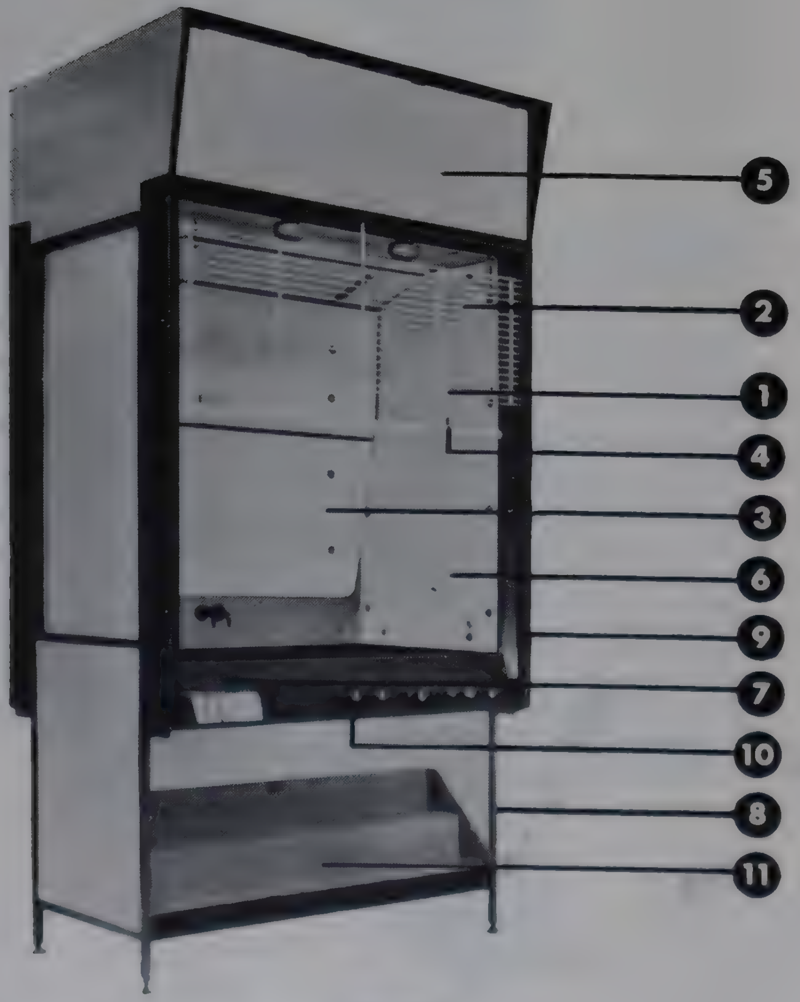


FV-314

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS



FV-320



FV-322

HIGH EFFICIENCY AIR-FLOW

The sash is used as a safety screen—not to retain fumes within the cupboard. Positive air-flow ensures that no eddies pass into the room and efficient scavenging is achieved with the minimum consumption of air from the laboratory.

- **Duct through double element sash** (1) and **main by-pass duct** (2) provide progressive two stage by-pass which automatically controls air velocity beneath the sash as it is raised or lowered.
- **Three element pre-adjusted baffle** (3) stabilises extracted air-flow.
- **Balanced draught duct incorporating baffle and filter** (5) further conserves conditioned air in laboratory by replacing calculated proportion of extraction with fresh air taken from outside building.

CORROSION RESISTANT MATERIALS

Technoplate * toughened glass body. Ends (6) sash (4) extraction baffles (3). Stainless steel (FMB grade) back and outlet duct connector.

Stainless steel, FMB grade, tanked work top (7) with rounded interior corners and waste outlet.

Condensation, if occurring, forms mainly on toughened glass and stainless steel surfaces, to fall directly inside lips of tanked work top.

GENERAL FEATURES

Sectional construction facilitates handling and reduces freight charges.

End frames (8) of square section steel tube, with floor-level adjusters.

Picture frame (9) of Moulmein teak, finished with polyurethane. Front rail (10) mounts front controlled services. Rear frame also of teak.

Rimless double element sash (4) with interlocking weights counterpoised on stainless steel lines.

Top lighting by means of fluorescent tube mounted above the inner roof lining.

Stepped bottle shelves (11) of PVC. Can be vented by exhaust system as optional extra.

Cleaning and decontamination facilitated by smooth finish, rimless panels and sashes.

The grilles illustrated over the main by-pass duct (2) are not fitted as standard equipment, but can be provided as an optional extra.

***Technoplate** toughened glass is capable of withstanding both considerable impact and distributed heat. It is normally unaffected by the action of all alkalis and organic substances and all acids, with the exception of hydrofluoric acid. To minimise the effect of the latter, the Technoplate used in the construction of the cupboard is obscured, by etching in the case of the extraction baffle elements, and by ceramic white fired externally on the end panels. The result is that such etching as may occur is not readily discernible.

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS

STABILISED EXTRACTION SYSTEM

When the sash is fully raised to provide an access height of 2 ft 9 in the air drawn into the cupboard passes across the open face beneath the sash. Velocities are acceptably even. As the sash is lowered, the stage one by-pass between the two sash elements conveys air to the top of the cupboard to control velocity over the reduced face aperture. As the sash is brought down still further, the stage two main by-pass is operated, again to limit face velocity beneath the sash. This control is maintained until the sash is fully lowered. According to the task to be performed, nominal face velocities (with sash fully raised) can vary from 40 to 120 ft/min dependent on the fan and duct system employed. Within this range, the exceptionally gentle nature of the extraction will interfere in no way with the work being done, and efficient scavenging is assured.

FV-320

FUME CUPBOARD, *Gallenkamp* **'Openflow II', with by-pass, for stabilised extraction.** Overall 4 ft 9 in wide × 3 ft 0 in deep × 8 ft 0 in high. Body ends and extract baffle of obscured Technoplate toughened glass. Back and duct connector (nominal 12 in × 6 in), of FMB grade stainless steel. Double element sash of transparent Technoplate toughened glass, counterpoised with interlocking weights on stainless steel lines. Picture frame of Moulmein teak. Rear frame of teak. Outer roof of laminated timber with white polyurethane finish. Tanked work top made from FMB grade stainless steel with waste outlet. End frames of square section steel, with floor-level adjusters and lower panels finished both sides in white melamine plastics. Stepped Winchester quart bottle rack of PVC fitted below cupboard with back finished in white melamine plastics. Front controlled services mounted on inclined fascia panel include one switch wired to interior lighting, two 13A electric sockets, two cold water fittings FV-779, with two vertical mounting swannecks FV-792, two gas cocks FV-771, one vacuum valve FV-772 and one compressed air valve FV-773.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding exhaust fan and trunking ... ... Each **£475·00** *f*

ASSEMBLY AND INSTALLATION. Assembly instructions are provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

BALANCED DRAUGHT SYSTEM

It is wasteful if a fume cupboard removes excessive quantities of expensively conditioned air from the laboratory. This applies particularly in a small room accommodating several cupboards, and/or where a cupboard is provided with extraction involving a high face velocity, say 100 ft/min, to remove highly toxic or corrosive fumes. The FV-322 balanced draught system overcomes the problem by replacing a calculated proportion of the extraction with untreated air drawn from outside the building. This balancing air is passed from the roof of the cupboard, through a larger filtered duct, to discharge at low velocity vertically behind the sash. It becomes entrained with air, induced from the room across the open face beneath the sash, to form a flow pattern resembling that of the FV-320 stabilised extraction system. The result is a significant reduction of velocity across the open face. Usually approximately 55% replacement with untreated air is achieved but the proportion can be varied sometimes by selecting appropriate fans to suit specific requirements. The system, by reason of its gentle action, offers no discomfort to the operator nor interferes with work in hand. This, coupled with extremely efficient scavenging, is a condition rarely found in balanced and auxiliary air fume cupboards.

FV-322

FUME CUPBOARD, *Gallenkamp* **'Openflow II', with by-pass, for balanced draught and stabilised extraction.** Overall 4 ft 9 in wide × 3 ft 0 in deep and 3 ft 3 in deep at ceiling × 9 ft 6 in high. As FV-320, but with balanced draught duct mounted on roof. Duct fabricated from laminated timber, finished externally in white polyurethane, with interior baffle and glass-fibre filter. An inlet hole of 10 in diameter is provided in the roof of the duct to accommodate a flanged entry.

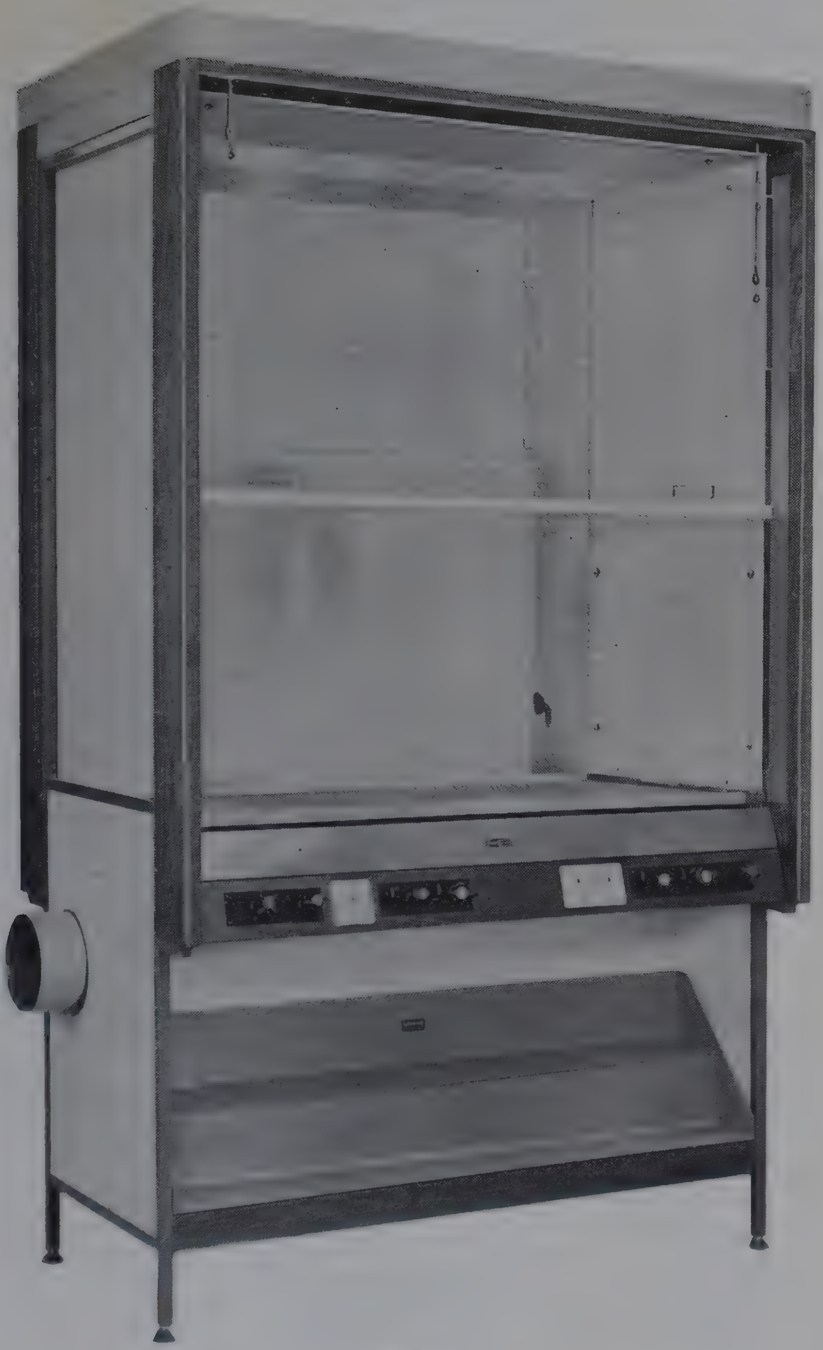
Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding fans and trunking ... ... Each **£537·00** *f*

DIMENSIONS	FV-320	FV-322
WIDTH, overall	4 ft 9 in	4 ft 9 in
WIDTH, internal	4 ft 6 in	4 ft 6 in
DEPTH, overall	3 ft 0 in	3 ft 3 in
DEPTH, internal	2 ft 0 in	2 ft 0 in
HEIGHT, overall	8 ft 0 in	9 ft 6 in
HEIGHT, inside fume cupboard	4 ft 8 in at front 4 ft 4 in at rear	4 ft 8 in at front 4 ft 4 in at rear

For 'Openflow II' Cupboard with down-draught extraction see overleaf.

Gallenkamp 'OPENFLOW II' FUME CUPBOARD

With downdraught extraction, water cooled baffle and scrubbing chamber



FV-323

STABILISED EXTRACTION SYSTEM

When the sash is fully raised to provide an access height of 2 ft 9 in, the air drawn into the cupboard passes across the open face beneath the sash. Velocities are acceptably even. As the sash is lowered, the stage one by-pass between the two sash elements conveys air to the top of the cupboard to control velocity over the reduced face aperture. As the sash is brought down still further, the stage two main by-pass is operated, again to limit face velocity beneath the sash. This control is maintained until the sash is fully lowered. According to the task to be performed, nominal face velocities (with sash fully raised) can vary from 40 to 120 ft/min dependent on the fan and duct system employed. Within this range, the exceptionally gentle nature of the extraction will interfere in no way with the work being done, and efficient scavenging is assured.

Down-draught extraction. In a down-draught extraction system fumes are drawn into a baffle which is fitted with a water spray to achieve cooling and, in some cases, partial absorption. The combined flow of fumes, air and water then passes through a scrubbing chamber, in which a further cold water spray operates, and thence fumes are conveyed through a duct and fan to atmosphere. This system, combined with consideration of the materials used for the construction of the fume cupboard has caused many users to specify this equipment for the extraction of perchloric acid fumes to their complete satisfaction.

FV-323

FUME CUPBOARD, *Gallenkamp* **'Openflow II', with by-pass, stabilised down-draught pattern, with water cooled baffle and scrubbing chamber.** Overall 4 ft 9 in wide × 3 ft 0 in deep × 8 ft 0 in high. Body ends and roof of obscured Technoplate toughened glass. Double element sash of transparent Technoplate toughened glass, counterpoised with interlocking weights on stainless steel lines. Back, double element baffle, tanked base and frame support for black Technoplate work top made from FMB grade stainless steel. The tanked base has a combined flue and drain outlet. This outlet discharges directly into a scrubbing chamber, made from rigid PVC, which is fitted at the rear of the cupboard beneath the work top with an 8 in internal diameter PVC flue outlet at the left hand side of the unit, as illustrated. The scrubbing chamber is provided also with an internal water spray and drain outlet. Front picture frame and rear frame of Moulmein teak. Outer roof of laminated timber with white polyurethane finish. End frames of square section steel with floor level adjusters and lower panels finished both sides in white melamine plastics. Stepped Winchester quart bottle rack of PVC fitted below cupboard, in front of scrubbing chamber, with back of white melamine plastics. Front controlled services mounted on inclined fascia panel include one switch to operate the lighting, two 13A switch sockets, two cold water fittings FV-779 with two vertical mounting swannecks FV-792, two gas cocks FV-771, one vacuum valve FV-772 and one compressed air valve FV-773. An additional cold water control FV-779 is fitted to control the water spray together with two valves to regulate the flow.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding exhaust fan and trunking ... ... Each **£665·00** *f*

The exhaust flue outlet is specified and illustrated as being at the left hand side of the unit. Right hand or rear connections can be arranged if required.

ASSEMBLY AND INSTALLATION. Assembly instructions are provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

MANIPULATOR BOXES

MA-950

MANIPULATOR GLOVE BOX, *Gallenkamp*, for the safe handling of low radioactivity isotopes, bacterial colonies, toxic powders, hygroscopic substances and other hazardous materials. Constructed from heavy gauge steel, rustproofed and stove enamelled with all corners radiused to permit easy cleaning. With Perspex window 61 × 37 cm, two 16·5 cm dia. glove ports fitted with ambidextrous rubber gauntlets and automatic air-lock loading hatch. Both the box and loading hatch are fitted with stopcocks for connection to dry air or inert gas supply, and the box can be used at negative pressures up to 1½ in w.g.

External dimensions

Manipulator box (excluding hatch)	69 × 45 × 42 cm high
Loading hatch	22 × 22 × 21 cm high
Maximum width	102 cm

Supplied with internal polystyrene tray 46 × 35 cm and two latex gloves size 9.

For price see entry in List No. sequence.

MA-950

MA-970

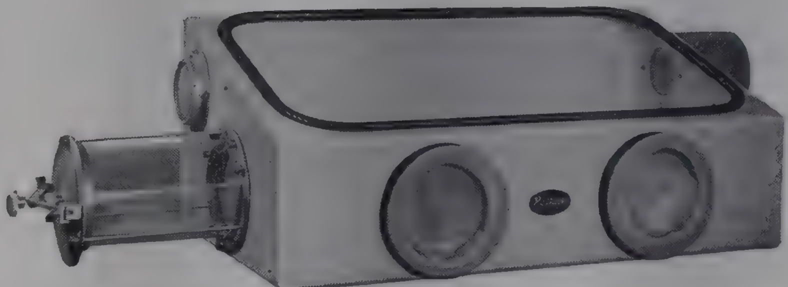
MANIPULATOR GLOVE BOX, for the safe handling of low activity radioisotopes, bacteria, toxic substances and other hazardous materials. An important feature is the hermetically sealed air lock, equipped with quick action doors, permitting passage of materials in and out of the box without affecting the internal conditions.

The box is fabricated from mild steel, finished internally white glaze vitreous enamel, with radii on all corners. An extraction fan maintains a slight negative pressure against the possibility of small leaks at the glove ports or air lock. Air is exhausted through a disposable micro-filter; air entering the cabinet is filtered down to 2 microns. There are two glove ports fitted with gloves size 9 for manipulation of apparatus within the box. The viewing panel is plate glass. A removable panel at one end can be adapted to take any services required inside the box. For 220/240V 50 Hz single phase supplies.

Dimensions

Manipulator box	92 × 51 × 38 cm high
Overall width	135 cm

For price see entry in List No. sequence.



MA-970

MA-980

MANIPULATOR BOX, PATHOLOGICAL. Conforming with British Medical Council practice, this unit ensures positive protection to operators in the preparation of cultures and grinding of contaminated tissues and other hazardous operations. Suitable for bench mounting and fabricated from mild steel, the interior of the cabinet is finished white stoved enamel with well radiused corners. In service there is an air flow across the cabinet aperture giving an air change every 25 seconds. The exhaust air is passed through an expendable filter which is arranged so that it need not be handled prior to incineration. The filter element container may be sterilised by UV rays. Complete with 60W striplight, UV lamp with safety cut-out, flue for Bunsen burner and front closure plate.

Dimensions

Overall	92 × 64 × 84 cm high

For price see entry in List No. sequence.

MA-980

When ordering please state voltage and frequency of supply.

FUME EXHAUST FANS

Efficient fume extraction plant is one of the most important features in a chemical laboratory and *Gallenkamp* are specialists in the field of designing, manufacturing and erecting such equipment. A complete service is offered based on many years experience and specialist engineers are available to advise on the selection of plant and subsequently to prepare designs and estimates.

The centrifugal and axial flow fans illustrated and specified have been designed to satisfy the varied and exacting requirements of laboratory fume extraction. Centrifugal fans have housings of specially selected polyester resin which bonds glass fibre, and impellers are of cast epoxy resin. Axial flow fans, recommended for use in less exacting conditions, also have polyester resin housings and motors are protected by epoxy resin enamel. Resin bonded materials have proved themselves as being particularly suitable for laboratory fume extraction, being extremely resistant to corrosive fumes and to perform satisfactorily in temperatures up to 120°C. There are four sizes in the range of centrifugal fans and two axial flow units, which enable very many plants to comprise standard fans and ducting at relatively small cost. If necessary, however, complete systems of a special nature can be supplied. Fans can be fabricated from rigid unplasticised PVC, and such units are usually employed in a plant which calls for fans larger than those contained in the standard ranges.

Ducting from fume cupboards to atmosphere can be fabricated from rigid unplasticised PVC or polypropylene, and for very many installations anti-acid treated asbestolite is much favoured.

Many plants are designed to meet the exacting conditions created by radioactive dust and toxic or explosive fumes. In these cases a high rate of extraction is usually required, and fans and ducting associated with balanced extraction systems can be incorporated in such schemes to reduce loss of conditioned air within the laboratory. We are also able to advise on the installation of laboratory air conditioning plant, which is a closely allied subject.

Plant design. We can advise on the selection of suitable equipment and prepare designs and estimates. Our design staff is at the disposal of customers contemplating new installations and, if necessary, a ventilation engineer will call to discuss details.

Projects however can be fully appreciated if the following information is provided:—

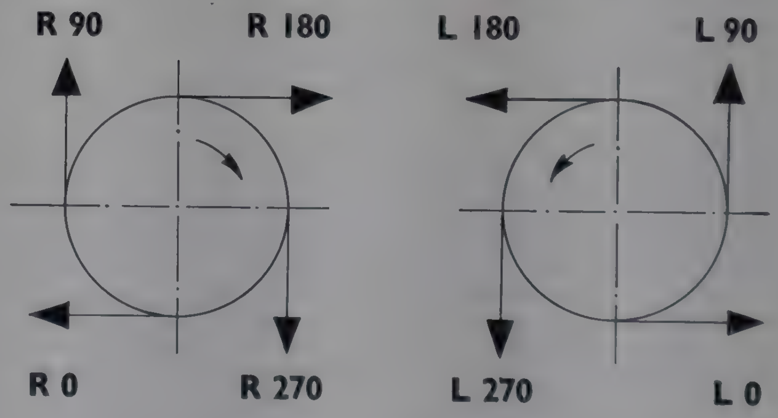
Plans and sectional drawings or dimensioned sketches, indicating the proposed position of the fume chamber, possible siting of the fan and an indication of the run of ducting.

Power supply. Please state voltage and characteristics of supply.

Hand of discharge. Please state prefix letter and figure required as shown on chart.

Nature of particularly corrosive fumes likely to be exhausted, with an indication of maximum temperature involved if likely to exceed 50°C.

Hands (directions) of discharge



The fans are viewed from the driving side and the angle of discharge is designated by the figures following the prefix, measured in degrees, and starting from the horizontal.

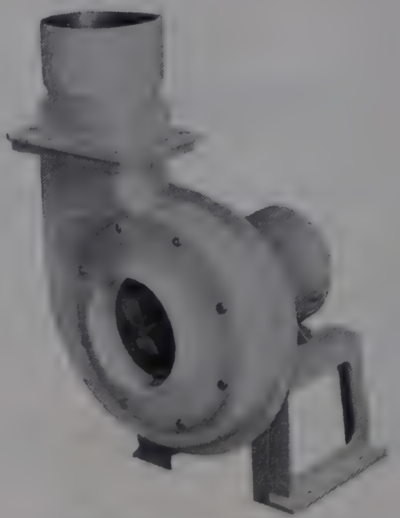
FIBREGLASS CENTRIFUGAL FANS FV-326 and FV-327

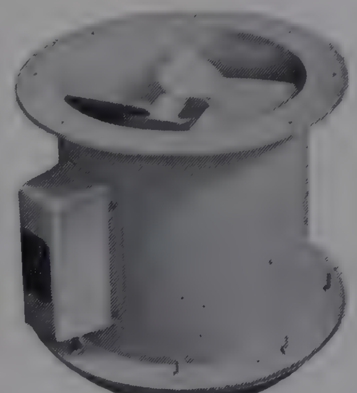
Fan housings are moulded from specially selected polyester resin and glass fibres in the ratio of approximately 2 to 1; being so constructed that no bolts, nuts or screws project into the interior of the casing. Inlet plates are fitted with spigots for connection to ducting. Outlets are flanged and fitted with treated asbestos developments. Plastics condensate drain plugs, screwed ¼ in gas thread are fitted at the lowest point of the housings.

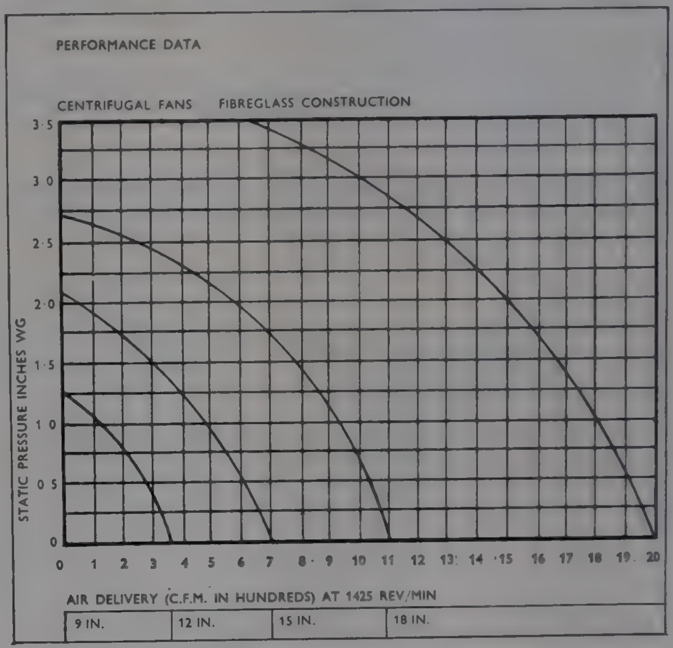
Impellers are of the radial vane type, cast in one piece from selected epoxy resin only.

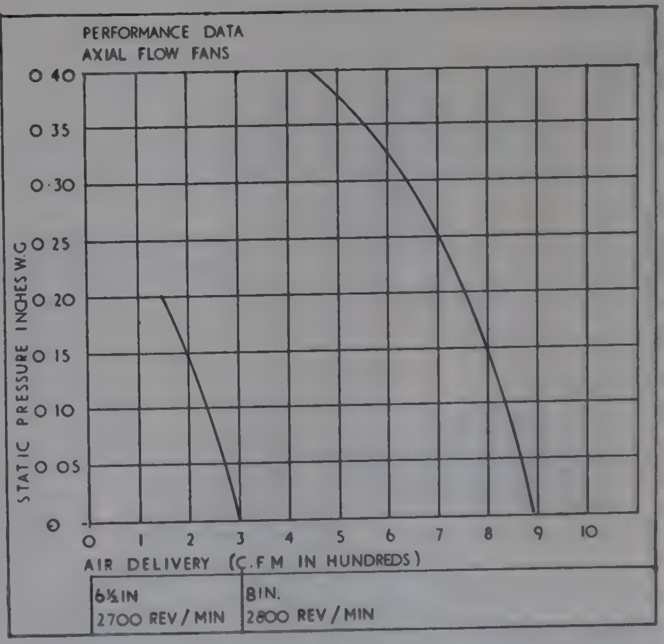
Motors. Direct coupled to the impeller, with a fume seal where the motor shaft enters the fan housing. Wound for single or three phase a.c. supply. Squirrel cage, drip-proof type casings are standard. Totally-enclosed or flame-proof motors can be supplied at extra cost.

Starters are of the push-button contactor type, fitted with no-volt and overload releases. Other starters can be supplied if required.


FV-326 and FV-327


FV-334





AXIAL FLOW FANS FV-334

Provide a compact and economical means of extraction from small fume cupboards. They may be inserted in a short run of ducting or fixed directly to the cupboard.

Fan chambers are moulded from polyester resin and glass fibre. Exterior metal flanges are fitted at each end for inserting in a run of ducting, or a PVC angle ring at one end for fixing directly to the fume cupboard.

Fan blades are moulded from nylon 2.

Motors are of the capacitor start and run type, totally enclosed with condensers mounted on the outside of the chamber.

Fans are available in two sizes, 6½ in and 8½ in diameter and require 7 in internal diameter heavy duty asbestolite ducting for the smaller fan, and 9 in internal diameter for the larger.

Exposed metal parts are treated with epoxy resin enamel.

Standard motors for both the axial and centrifugal fans are suitable for use in temperate and many tropical areas, but where temperature exceeds 40°C, relative humidity is more than 80%, or altitude is greater than 3200 ft, special motors and starters are necessary. Full details and prices on application.

Standard fans are not necessarily used in our plant designs, and are often fabricated specially to suit particular requirements.

TECHNICAL DATA

Type	Fan size	Speed rev/min	hp	Air delivery. Free intake and discharge	Approx. weight	Outlet pipe internal dia.	Inlet pipe internal dia.	Overall dimensions
Centrifugal	9 in	1425	¼	320 ft³/min	40 lb	5 in	5 in	15 × 16 × 16½ in
	12 in	1425	⅓	660 ft³/min	52 lb	6 in	6 in	16 × 19 × 20 in
	15 in	1425	¾	1150 ft³/min	65 lb	7 in	7 in	17 × 23½ × 23½ in
	18 in	1425	1½	2000 ft³/min	110 lb	9 in	9 in	20½ × 26 × 25 in
Axial flow	6½ in	2700	·05	300 ft³/min	12 lb	7 in	7 in	9 × 10 in dia.
	8½ in	2800	·05	900 ft³/min	15 lb	9 in	9 in	9 × 12 in dia.

FUME EXHAUST FANS

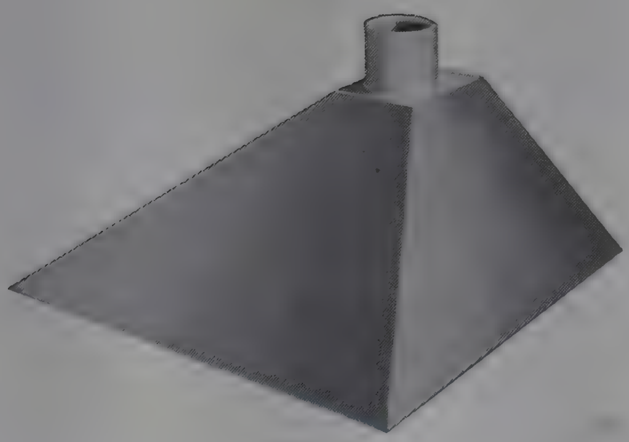
(continued)

			SIZE OF FAN				
			9	12	15	18 in	
FV-326	**FANS, centrifugal, fibreglass,** direct coupled to motor, for 200/220 or 230/240V 50 Hz single phase supplies ...	Each	£94·00	112·00	153·00	195·00	*mN*
FV-327	**FANS, centrifugal, fibreglass,** direct coupled to motor, for 380/440V 50 Hz three phase supplies	Each	£94·00	112·00	148·00	175·00	*mN*
FV-328	**STARTERS,** push-button, with combined thermal and magnetic overload releases, for FV-326	Each	£ 6·25	6·25	6·25	9·50	*mN*
FV-329	**STARTERS,** push-button, with combined thermal and magnetic overload releases, for FV-327	Each	£ 6·25	6·25	6·25	6·25	*mN*
FV-330	**SHELVES,** asbestolite, with steel cantilevers for supporting fan and motor on wall	Each	£ 5·50	5·50	7·25	7·75	*mN*

			SIZE OF FAN		
			6½	8½ in	
FV-334	**FANS, axial flow, fibreglass,** with motor for 220/240V 50 Hz single phase supplies	Each	£53·00	76·00	*m*
FV-335	**STARTERS,** push-button, with thermal overload release, for FV-334	Each	£ 3·20	3·20	*m*
FV-336	**FLANGES,** matching, to connect axial flow fan to ducting.	Pair	£ 5·00	5·70	*m*
FV-337	**GASKETS,** jointing, for use with matching flanges	Pair	£ 1·10	1·25	*m*
FV-338	**RINGS,** angle, PVC, to connect axial flow fan to fume cupboard	Each	£ 4·00	4·80	*m*

When ordering please state voltage and frequency of supply.
Prices for equipment wound for non-standard a.c. and d.c. supplies can be quoted on application.

COMBUSTION HOODS



FV-340

FV-340

COMBUSTION HOOD, asbestolite, moulded in single piece, anti-acid treated on all surfaces, 2 ft wide × 2 ft deep × 9½ in high with spigot for 5 in diameter flue. For wall fixing, **without brackets or flue pipe.** Each **£14·25** c

FV-342

COMBUSTION HOOD, asbestolite, as FV-340, 4 ft wide × 2 ft 3 in deep × 1 ft 5 in high, **without brackets or flue pipe** ... ... Each **£19·00** c

FV-344

COMBUSTION HOOD, asbestolite, as FV-340, 6 ft wide × 2 ft 3 in deep × 1 ft 5 in high, **without brackets or flue pipe** ... ... Each **£39·00** c

FV-346

BRACKETS, cantilever, metal, enamelled, 3 ft long, for mounting hoods on wall ... ... Pair **£2·50** c

Fabricated hoods to suit special needs also available. Details on application.

Items on this page normally available from stock except those coded *N*.

ASBESTOLITE FLUE PIPES

Made of asbestos material, specially treated to resist acid fumes.
Pipes are easily cut with a fine saw and secured to walls, etc., with ordinary fascia brackets.

		INTERNAL DIAMETER						
		4	5	6	7	8	9 in	
FV-350 **STRAIGHT PIPES,** with socket. In 6 ft lengths	Each	£2·00	2·50	3·10	5·60	6·25	7·25	c
FV-351 **SOCKETS,** loose, to connect unsocketed pipes...	Each	£0·50	0·65	0·90	1·35	1·50	1·90	c
FV-352 **BENDS,** 90°, with socket ...	Each	£0·75	0·95	1·15	2·20	3·40	3·80	c
FV-353 **BENDS,** 110°, with socket ...	Each	£0·75	0·95	1·15	2·20	3·40	3·80	c
FV-354 **BENDS,** 135°, with socket ...	Each	£0·75	0·95	1·15	2·20	3·40	3·80	c
FV-357 **TEES,** equal	Each	£0·75	0·95	1·15	2·20	3·40	3·80	c
FV-358 **TEES,** reducing, branch pipe of 4 in dia. Main pipe as listed	Each	£ —	0·95	1·15	—	—	—	c
FV-359 **TEES,** reducing, branch pipe of 5 in dia. Main pipe as listed	Each	£ —	—	1·15	—	—	—	c
FV-361 **ADAPTERS,** tapered, small end 4 in dia. Large end, with socket, as listed.	Each	£ —	0·90	—	—	—	—	c
FV-363 **COWLS,** anti-pocket, with deflector cap and socket...	Each	£2·90	3·40	3·90	—	—	—	c

FV-365

DISCHARGE TERMINAL CAPS, for high velocity terminal discharge. Constructed throughout from anti-acid treated asbestolite with PVC inserts, designed to eliminate the possible entry of rainwater also to ensure that outgoing fumes discharge vertically. This terminal assists fan performance, as it offers practically no resistance.

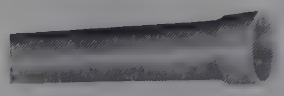
Size of terminal	4 in	5 in	6 in	7 in	8 in	9 in dia.	
Each	£6·50	8·00	9·00	10·00	11·00	12·50	*mN*

Pipes of 4, 5 and 6 in dia. are normally supplied in light quality, whereas pipes of 7, 8 and 9 in dia. are only manufactured in heavy quality. Fittings involving pipes of both large and small diameter, e.g., reducing tee FV-358, 7–4 in, are supplied throughout in heavy quality, whilst the same pattern reducing tee 6–4 in is supplied throughout in light quality. The unsocketed end of a heavy duty pipe will not fit into the socket of a light duty pipe of equal dia., but can be accommodated within an unsocketed light duty pipe of 1 in larger dia.

FV-370

CEMENT, for jointing asbestolite piping and bench tops, fireclay and stoneware troughs and pipes, etc. Supplied in a tin with a separate tin of solvent solution, and full directions for use.

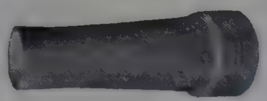
Weight	1	4·5	18 lb	
Each	£1·15	4·20	10·50	c

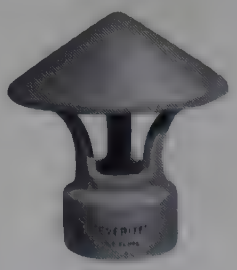

FV-350

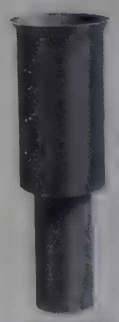
FV-352

FV-353

FV-357


FV-361

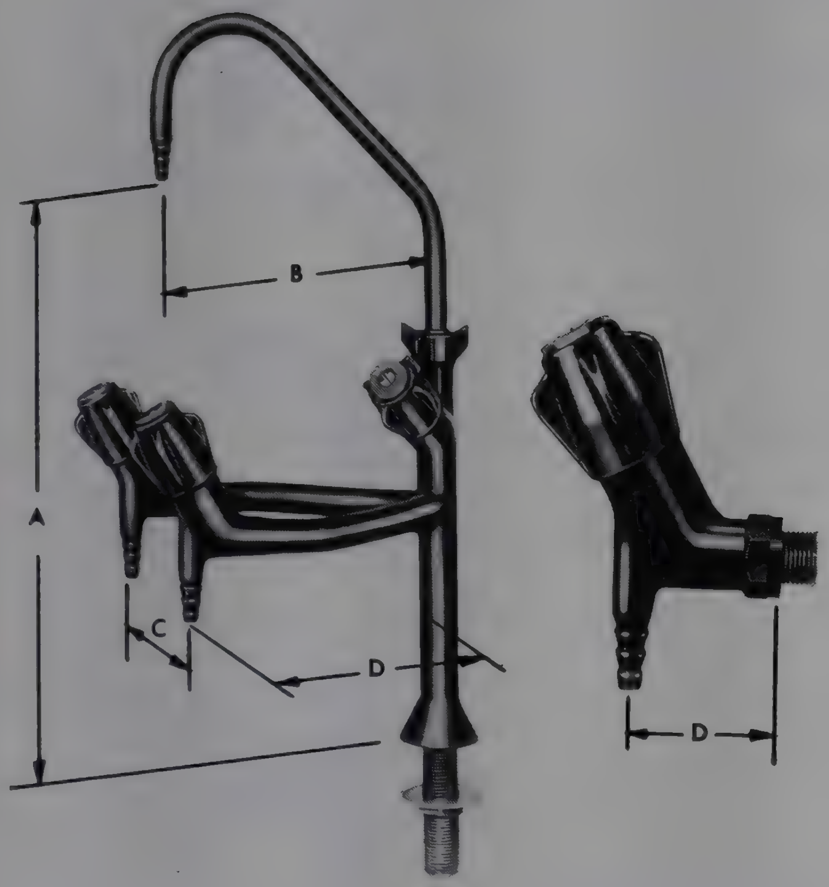

FV-363


FV-365

Items on this page normally available from stock except those coded *N*.

SERVICE CONTROLS FOR WATER, STEAM, GASES, COMPRESSED AIR AND VACUUM

Black plastics corrosion resistant finish. Control heads have distinctive shapes. Colour and letter coded controls denote service.



GENERAL CONSTRUCTION

All fittings are purpose designed ensuring complete suitability for the given applications.

This range with its attractive fully streamlined shape gives improved standouts and nozzle heights within overall dimensions which are generally reduced. Generally the fittings are manufactured from hard drawn brass tubing, brass pressings and extruded brass bar with the use of more specialised materials where advantageous.

FINISH

The fittings are protected against deterioration by the special three coat 'TEKTACOTE' surface finish, which has been developed to give a complete and reliable protection under the full range of working conditions encountered in Industrial, Educational and Medical Laboratories.

DIMENSIONS

The lettered illustrations on this page identify the dimensions in the tap specifications.

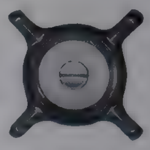
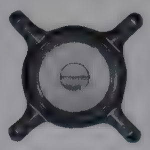
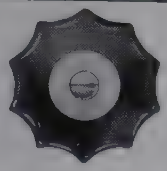
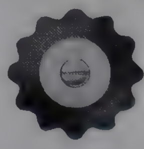
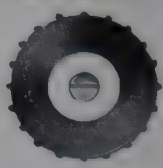
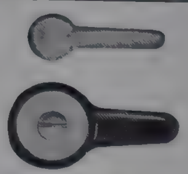
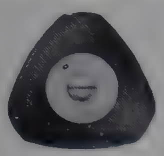
Bib taps. Standout 'D' is measured from the centre line of the nozzle to the inlet flange joint face.

Pillar standards. Standouts 'B' and 'D' are measured from the centre line of the outlet nozzle to the centre line of pillar. Dimension 'C' is measured between the nozzle outlet centres. Height 'A' is measured from the base under surface to the nozzle outlet.

CONTROL HEADS

All handwheels and levers are made from high impact strength plastics and designed to shroud the valve spindles and provide easy-clean shapes. All controls differ in shape according to the lservice and have appropriate coloured disks engraved with code etters as indicated in the panel below.

SERVICE IDENTIFICATIONS

SHAPE OF CONTROL HEAD							
SERVICE	Cold Water	Hot Water	Steam	Vacuum	Compressed Air	Gas (mains)	Other Gases
COLOUR CODE	Azure Blue	Red	Aluminium	Lincoln Green	White	Canary Yellow	Grey
LETTER CODE	C W	H W	S	V	C A	G	

The following do not conform to colour or letter codes, shape or finish indicated.

FV-765	Water stopcocks.	FV-825	Gas stopcocks.
FV-784	Water tap.	FW-410	Mixer tap.

All safety drop fan taps.

WATER TAPS

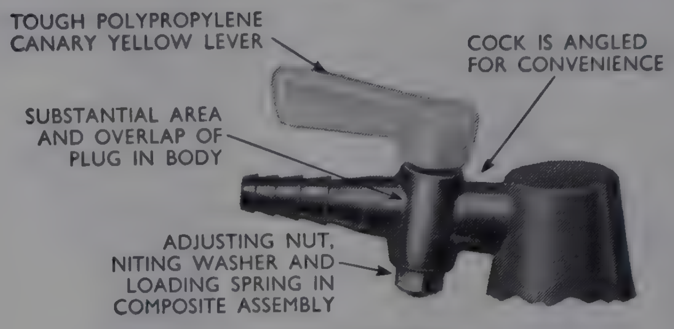
Incorporate the *Labtap* head which is a considerable improvement on previous designs. Each tap includes an 'O' ring self-adjusting gland seal, protected non-rotating sealing washer and metering device to give flow control from about 500 ml/min to full bore flow with three turns of the handwheel.

COLOUR DISC
EASYCLEAN POLYPROPYLENE HANDWHEEL

WATER TAPS

GAS COCKS

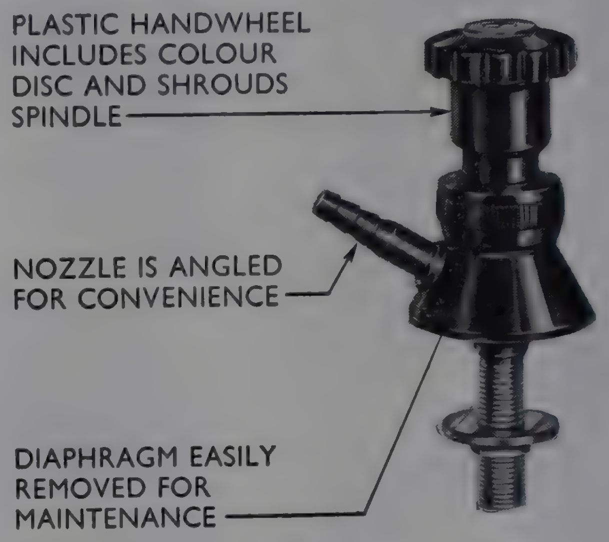
The gas cocks incorporated in bench fittings will give long trouble-free life. The plug is spring loaded to remain in adjustment over a long period. Underbench gas cocks have a similar specification. All cocks are suitable for town (coal), natural or low pressure LPG (bottled) gases at working pressures up to 24 in w.g.


TOUGH POLYPROPYLENE CANARY YELLOW LEVER
COCK IS ANGLED FOR CONVENIENCE
SUBSTANTIAL AREA AND OVERLAP OF PLUG IN BODY
ADJUSTING NUT, NITING WASHER AND LOADING SPRING IN COMPOSITE ASSEMBLY

GAS COCKS

NEEDLE VALVES

Incorporate non-rising headwork with reliable soft seat and good control characteristics. This design ensures a reliable long life performance and is superior to metal seat valves previously used. For use with compressed air, oxygen, nitrogen or steam.


PLASTIC HANDWHEEL INCLUDES COLOUR DISC AND SHROUDS SPINDLE
NOZZLE IS ANGLED FOR CONVENIENCE
DIAPHRAGM EASILY REMOVED FOR MAINTENANCE

DIAPHRAGM VALVES

Developed specially for laboratory work. When supplied for vacuum, throttles are fitted to nozzles to restrict throughput to 6 litres/min at 25 in Hg.

SERVICE INLET DETAILS

Water fittings inlets are ½ in BSP male thread and all other services have a ¼ in BSP male thread unless otherwise specified. Male inlets are supplied complete with flanged backnuts.

OUTLET DETAILS

Water swan-neck outlets have fixed serrated nozzles as standard.

Removable 'Y' type serrated nozzles are available to special order.

Steam and dry service outlets have fixed serrated nozzles.

INSTALLATION RECOMMENDATIONS

If water is tank supplied, a minimum head of 35 ft (15 lbf/in²) is required to operate water jet pumps.

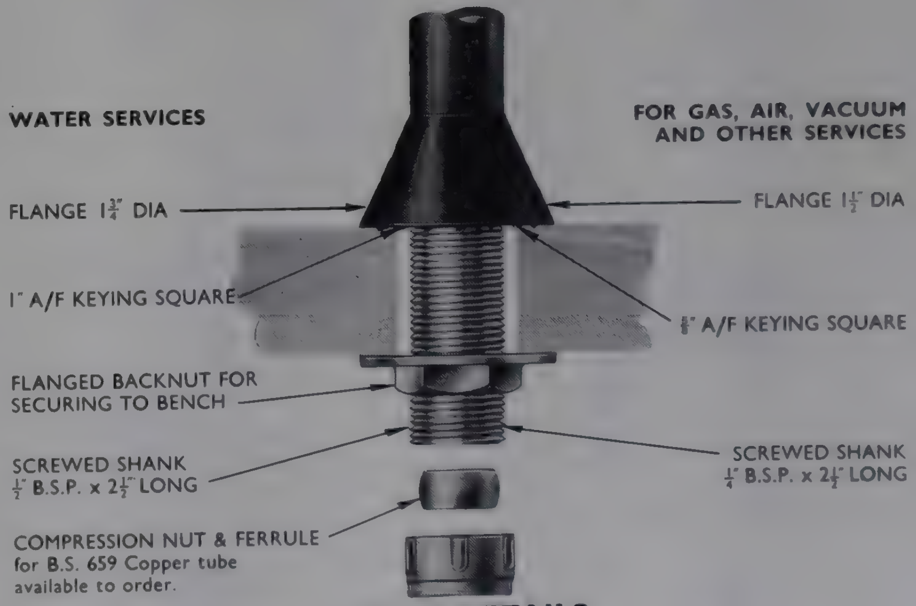
It is important to keep compressed air and other service pressures as low as possible, as a pressure of over 15/20 lbf/in² at the bench is dangerous.

It is essential that all service piping be flushed or blown clear of solid matter before any of the bench valves are used.

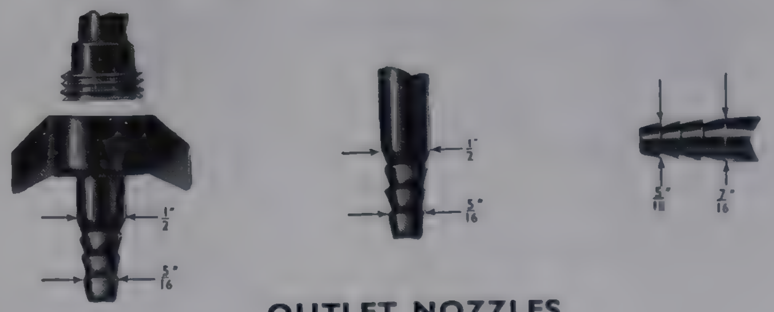
It is desirable that stop valves be fitted so that conveniently small sections of the laboratory can be isolated, both from safety and maintenance viewpoints.

Where a sink is to be used for wash-up purposes, the water supply should be by large bore individual water standards or mixer (FV-668, FV-685, FV-686). Where front controlled valves are used on benches or in fume cupboards, a single-way outlet only (FV-794, etc.) is permissible.

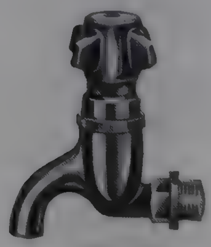
We recommend that a suitable proportion of water fittings are specified with detachable nozzles, to give long term flexibility to the laboratory.

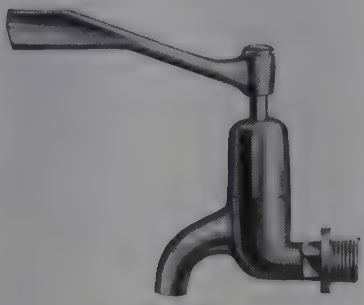

WATER SERVICES
FOR GAS, AIR, VACUUM AND OTHER SERVICES
FLANGE 1¾" DIA
FLANGE 1½" DIA
1" A/F KEYING SQUARE
⅝" A/F KEYING SQUARE
FLANGED BACKNUT FOR SECURING TO BENCH
SCREWED SHANK ½" B.S.P. x 2½" LONG
SCREWED SHANK ¼" B.S.P. x 2½" LONG
COMPRESSION NUT & FERRULE
for B.S. 659 Copper tube
available to order.

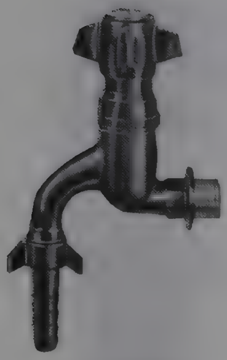
INLET DETAILS
BENCH or VERTICAL MOUNTINGS

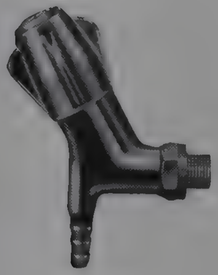

½"
5/16"
½"
5/16"
5/16"
7/16"

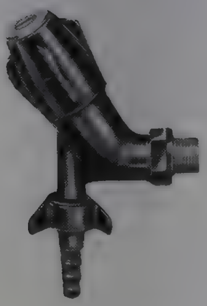
OUTLET NOZZLES

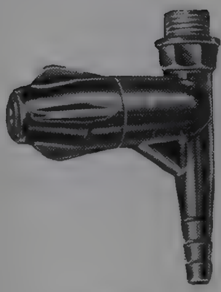

FV-651

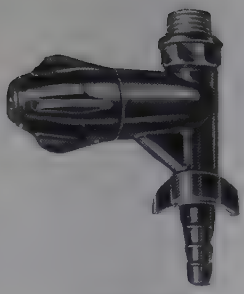

FV-652

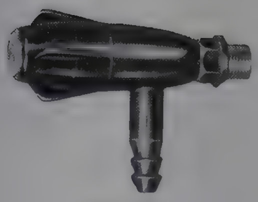

FV-653

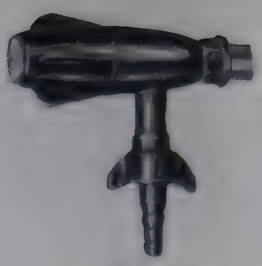

FV-654
FV-655

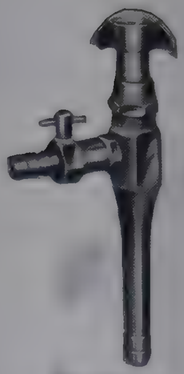

FV-656


FV-657


FV-658


FV-659


FV-660


FV-661

WATER FITTINGS

PIPE MOUNTING

Dimension code see page 328.

FV-651

BIB TAP, screw down valve. Inlet ½ in male, outlet plain, with anti-splash. (D = 3 in).
Ten **£28·00** Each **£3·10** c

FV-652

BIB TAP, wrist action lever. Inlet ½ in male, outlet plain, with anti-splash lever 4¾ in. (D = 3 in).
Ten **£60·00** Each **£6·60** c

FV-653

BIB TAP, screw down valve. Inlet ½ in male, outlet ½ in male complete with nozzle and wingnut for ½ in bore hose. (D = 3 in).... Ten **£34·00** Each **£3·80** c

FV-654

BIB TAP, screw down valve. Inlet ½ in male. Serrated nozzle outlet. (D = 1¾ in).
Ten **£27·50** Each **£3·10** c

FV-655

BIB TAP, screw down valve. Inlet ⅜ in male, outlet serrated nozzle. (D = 1¾ in).
Ten **£27·50** Each **£3·10** c

FV-656

BIB TAP, screw down valve. Inlet ⅜ in male, outlet ½ in male for use with filter pump FV-661. Complete with wing nut and nozzle. (D = 1¾ in).
Ten **£32·00** Each **£3·60** c

FV-657

DROP TAP, screw down valve. Inlet ½ in male, outlet serrated nozzle. (D = 3½ in).
Ten **£27·50** Each **£3·10** c

FV-658

DROP TAP, screw down valve. Inlet ½ in male, outlet ½ in male for use with filter pump FV-661. Complete with wing nut and nozzle. (D = 4 in).
Ten **£32·00** Each **£3·60** c

FV-659

ANGLE TAP, screw down valve. Inlet ⅜ in male, outlet serrated nozzle. (D = 1¼ in).
Ten **£27·50** Each **£3·10** c

FV-660

ANGLE TAP, screw down valve. Inlet ⅜ in male, outlet ½ in male for use with filter pump FV-661. Complete with wing nut and nozzle. (D = 1¼ in).
Ten **£32·00** Each **£3·60** c

FV-661

FILTER PUMP. ½ in female wing nut connection. Fitted with non-return valve and bleeder screw. Chromium-plated finish. (Vacuum gauge can be supplied at extra cost) ... ... Ten **£52·00** Each **£5·80** c

All items on this page normally available from stock.

WATER FITTINGS

BENCH MOUNTING

Dimension code see page 328.

FV-666
WATER METERING CONTROL VALVE. ½ in female wing nut connection. Will regulate water supply to a slow drip. Ten **£25·50** Each **£2·85** c

FV-667
NOZZLE. ½ in female wing nut connection. Serrated for hose ... ... Ten **£4·20** Each **£0·47** c

FV-668
BIB TAP STANDARD. Plain anti-splash outlet, ½ in male inlet. (A = 9 in) (B = 6 in). Ten **£62·00** Each **£7·00** c

FV-669
BIB TAP STANDARD. Plain anti-splash outlet, ½ in male inlet. (A = 12 in) (B = 6 in). Ten **£66·00** Each **£7·40** c

FV-670
BIB TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 9 in) (B = 6 in). Ten **£62·00** Each **£7·00** c

FV-671
BIB TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 12 in) (B = 6 in). Ten **£64·00** Each **£7·20** c

FV-672
ANGLE TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 9 in) (B = 6 in). Ten **£66·00** Each **£7·40** c

FV-673
ANGLE TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 12 in) (B = 6 in). Ten **£70·00** Each **£7·80** c

FV-674
FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 9 in) (B = 6 in). Ten **£56·00** Each **£6·20** c

FV-675
FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 12 in) (B = 6 in). Ten **£57·00** Each **£6·40** c

FV-676
FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 15 in) (B = 6 in). Ten **£59·00** Each **£6·60** c

FV-677
MOVABLE SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 9 in) (B = 6 in). Ten **£58·00** Each **£6·40** c

FV-678
MOVABLE SWAN-NECK STANDARD. As FV-677 but (A = 12 in) (B = 6 in). Ten **£59·00** Each **£6·60** c

FV-679
MOVABLE SWAN-NECK STANDARD. As FV-677 but (A = 15 in) (B = 6 in). Ten **£62·00** Each **£7·00** c

FV-680
LARGEBORE, SWIVEL SWAN-NECK STANDARD. Plain anti-splash outlet, ½ in male inlet. (A = 9 in) (B = 6 in) ... ... Ten **£72·00** Each **£8·00** c

FV-681
SWIVEL ARM JET SPRAY TAP. Inlet ½ in male. (A = 10 in). Overall length 14 in ... Each **£17·60** c

FV-666

FV-667

FV-668
FV-669

FV-670
FV-671

FV-672
FV-673

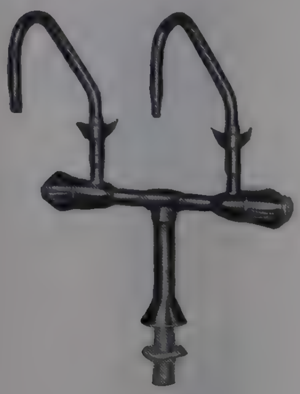
FV-674
FV-675
FV-676

FV-677
FV-678
FV-679

FV-680

FV-681

All items on this page normally available from stock.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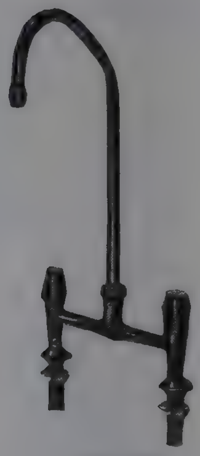
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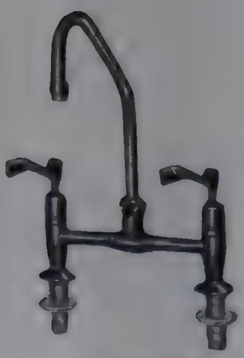
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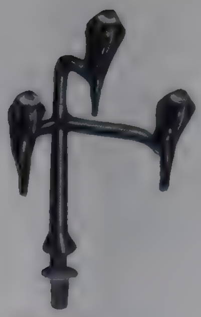
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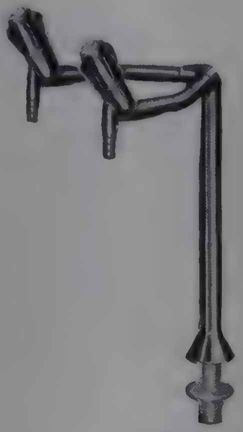
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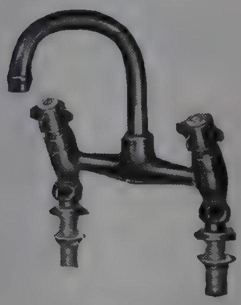
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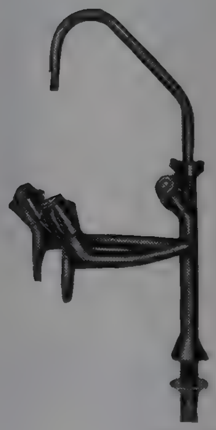
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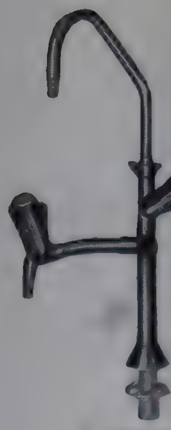

FV-691

WATER FITTINGS

BENCH MOUNTING

(continued)

Dimension code see page 328.

FV-682
SWAN-NECK STANDARD, two movable swan-necks, serrated nozzle outlets. Inlet $\frac{1}{2}$ in male. (A = 12 in) (B = 6 in) (C = 6 in) ... ... Each **£13·20** c

FV-683
BIB TAP STANDARD, two bib taps, serrated nozzle outlets. Inlet $\frac{1}{2}$ in male. (A = 9 in) (B = 6 in) (C = 6 in). Each **£11·25** c

FV-684
BIB TAP STANDARD, as FV-683 but (A = 12 in). Each **£11·50** c

FV-685
MIXER TAP, swivel swan-neck, plain anti-splash outlet, $\frac{1}{2}$ in male inlets at 7 in centres (A = 12 in) (B = 6 in). Not suitable for mains supply ... Each **£11·00** c

FV-686
DIVIDED FLOW MIXER TAP, swivel swan-neck, outlet. $\frac{1}{2}$ in, male inlets at 7 in centres (A = 6 in) (B = 7 in). Suitable for mains supply ... Each **£18·00** c

FV-687
MIXER TAP, wrist action lever control, swivel swan-neck, plain anti-splash outlet. $\frac{1}{2}$ in, male inlets at 7 in centres. (A = 12 in) (B = 6 in). Not suitable for mains supply ... ... Each **£15·50** c

FV-688
SWAN-NECK STANDARD, three way, with movable swan-neck. Two side bib taps. $\frac{1}{2}$ in male inlet. (A = 12 in) (B = 6 in) (C = 6 in) ... ... Each **£16·00** c

FV-689
SWAN-NECK STANDARD, three way, as FV-688 but (A = 15 in)... ... ... Each **£16·20** c

FV-690
BIB TAP STANDARD, three bib taps. Serrated nozzle outlets. (A = 12 in) (B = 6 in) (C = 6 in). Each **£16·20** c

FV-691
SWAN-NECK STANDARD, two way, centre movable **swan-neck,** side bib tap, serrated nozzle outlets. Each **£11·50** c

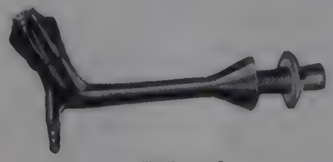
All items on this page normally available from stock.

WATER FITTINGS

VERTICAL SURFACE MOUNTING

Dimension code see page 328.

FV-701
BIB TAP FITTING, serrated nozzle outlet, inlet ½ in male. (D = 6 in) ... ... Each **£5·30** c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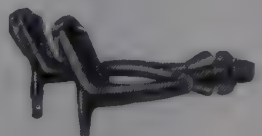
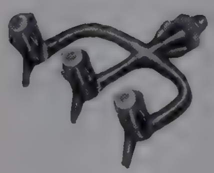

FV-702

FV-702
BIB TAP FITTING, two serrated nozzle outlets, inlet ½ in male. (D = 6 in) (C = 6 in) ... Each **£10·00** c

FV-703
BIB TAP FITTING, three serrated nozzle outlets, inlet ½ in male. (D = 6 in) (C = 3 in) ... Each **£13·75** c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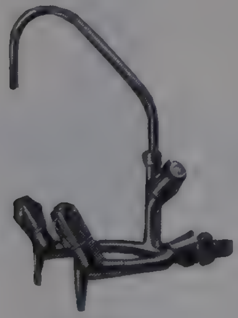
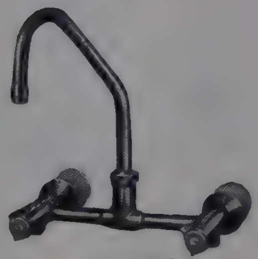

FV-704

FV-704
SWAN-NECK FITTING, centre movable swan-neck, two side bib taps. Serrated nozzle outlets, inlet ½ in male. (A = 6 in) (B = 6 in) (C = 6 in). Each **£16·00** c

FV-705
MIXER TAP, swivel swan-neck, with plain anti-splash outlet, inlets ½ in male at 7 in centres (A = 6 in) (B = 7¾ in) ... ... Each **£10·75** c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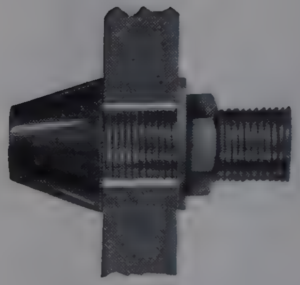
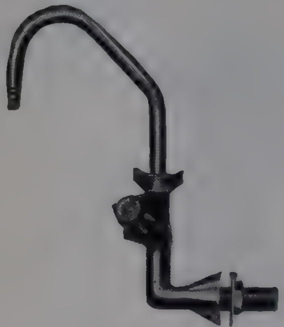

FV-706
FV-707

FV-706
FLANGED TAP ADAPTER, to adapt pipe mounting taps ⅜ in male to vertical mounting. Inlet ½ in male. Each **£1·90** c

FV-707
FLANGED TAP ADAPTER, as FV-706 but for use with taps screwed ½ in male ... ... Each **£2·30** c

FV-708
SWAN-NECK FITTING, with movable swan-neck, serrated nozzle outlet, inlet ½ in male. (A = 6 in) (B = 4½ in) ... ... Each **£7·20** c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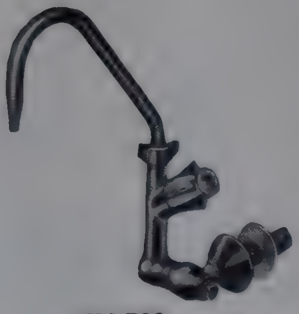
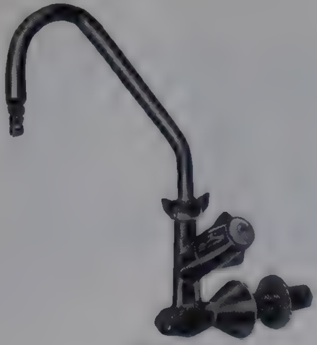

FV-709

FV-709
SWAN-NECK FITTING, forward fold down, with movable swan-neck, inlet ½ in male. (A = 6 in) (B = 4½ in). Overall length 13 in ... ... Each **£11·50** c

FV-710
SWAN-NECK FITTING, side fold down, with movable swan-neck, inlet ½ in male. (A = 6 in) (B = 4½ in). Each **£11·50** c

FV-711
DROP FITTING, fitted with two angle taps and one centre drop tap. Serrated nozzle outlets, inlet ½ in male. (B = 3 in) ... ... Each **£11·80** c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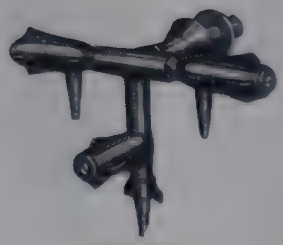
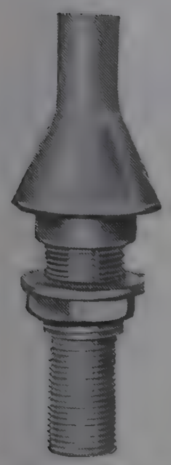
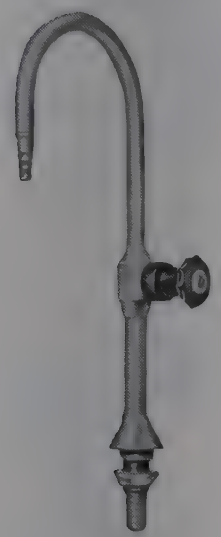

FV-711

All items on this page normally available from stock.

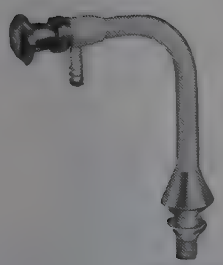
PVC WATER FITTINGS



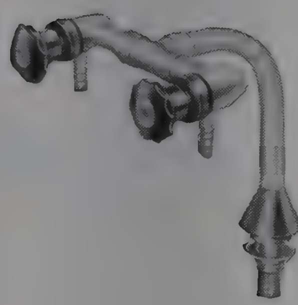
INLET CONNECTION



FV-717



FV-718



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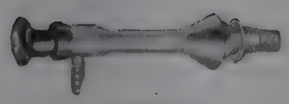
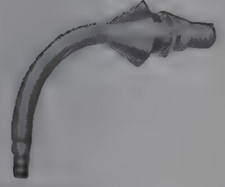
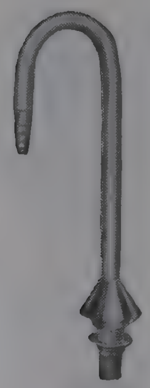


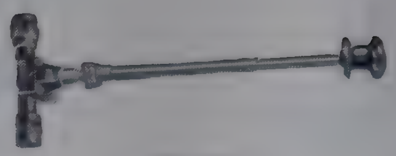
FV-720



FV-722



FV-721



FV-723

Dimension code see page 328.

Designed for demineralised, distilled, sea and corrosive well waters, etc. No metal parts are in contact with the supply liquid, thus ensuring no metallic contamination or corrosion.

A diaphragm valve is used for control, with plastics handwheel and coded disk.

DETAIL OF INLET CONNECTION

PVC pillar tube runs through base with ½ in BSP connection. Metal ¾ in BSP bench fixing shank.

FV-717
FIXED SWAN-NECK STANDARD, ½ in male inlet, serrated nozzle outlet. (A = 12 in) (B = 6 in).
Each **£12·35** c

FV-718
ANGLE VALVE STANDARD, ½ in male inlet, serrated nozzle outlet. (A = 6 in) (B = 6 in) ... Each **£9·10** c

FV-719
ANGLE VALVE STANDARD, ½ in male inlet, serrated nozzle outlets. (A = 6 in) (B = 6 in) (C = 6 in).
Each **£19·80** c

FV-720
ANGLE VALVE FITTING, ½ in male inlet, serrated nozzle outlet. (B = 6 in) ... ... Each **£8·00** c

FV-721
SWAN-NECK OUTLET, ½ in male inlet, serrated nozzle outlet. (A = 6 in) (B = 6 in). ... Each **£7·20** c
For use with FV-723 control valve.

FV-722
VERTICAL MOUNTING OUTLET, ½ in male inlet, serrated nozzle outlet. (B = 6 in) ... Each **£6·00** c
For use with FV-723 control valve.

FV-723
CONTROL VALVE. ½ in female connection, with extended spindle adjustable for lengths from 20 in to 30 in. For use with FV-721 and FV-722 outlets. Each **£11·25** c

All items on this page normally available from stock.

DIAPHRAGM CONTROL VALVES

For Vacuum and Pressure gases up to 100 lbf/in^2 (7 kgf/cm^2)

FV-741

IN-LINE VALVE (pipe mounting). $\frac{1}{4}$ in male inlet.
Serrated nozzle outlet. Ten **£27·50** Each **£3·10** c

FV-742

VERTICAL MOUNTING VALVE. $\frac{1}{4}$ in male inlet.
Serrated nozzle outlet. Ten **£37·00** Each **£4·10** c

FV-743

BENCH MOUNTING VALVE. $\frac{1}{4}$ in male inlet.
Serrated nozzle outlet. Ten **£35·00** Each **£3·90** c

FV-744

ANGLE VALVE (pipe mounting). $\frac{1}{4}$ in male inlet.
Serrated nozzle outlet. Ten **£30·00** Each **£3·40** c

FV-745

BENCH MOUNTING VALVE. $\frac{1}{4}$ in male inlet.
Serrated nozzle outlet. Ten **£45·00** Each **£5·00** c

FV-746

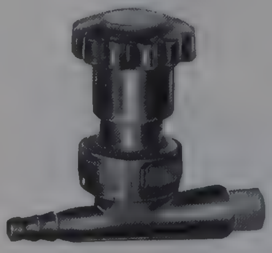
TWO WAY BENCH MOUNTING VALVE. $\frac{1}{4}$ in male inlet. Serrated nozzle outlets 180° apart.
Ten **£70·00** Each **£7·80** c

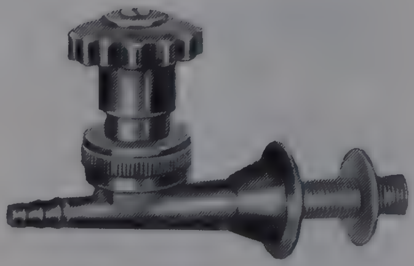
FV-747

TWO WAY BENCH MOUNTING VALVE. $\frac{1}{4}$ in male inlet. Serrated nozzle outlets 90° apart.
Ten **£70·00** Each **£7·80** c

FV-748

TWO WAY VERTICAL MOUNTING VALVE. $\frac{1}{4}$ in male inlet. Serrated nozzle outlets 90° apart.
Ten **£74·00** Each **£8·20** c


FV-741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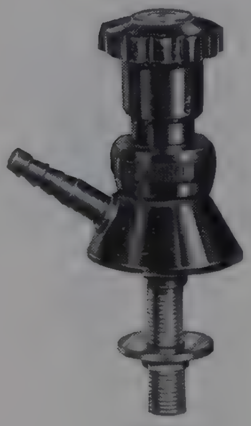
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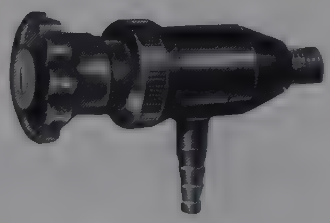
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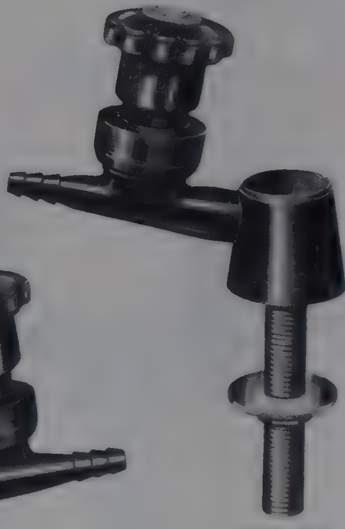
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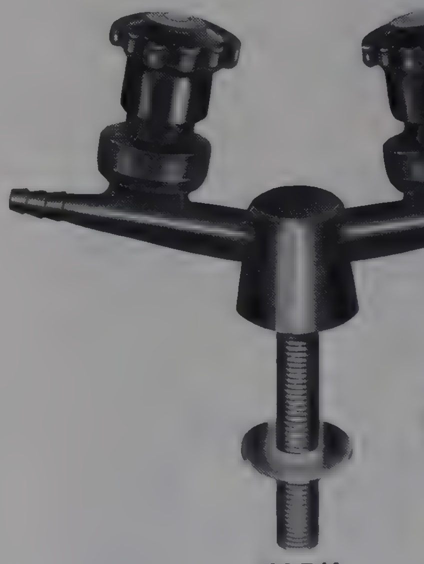
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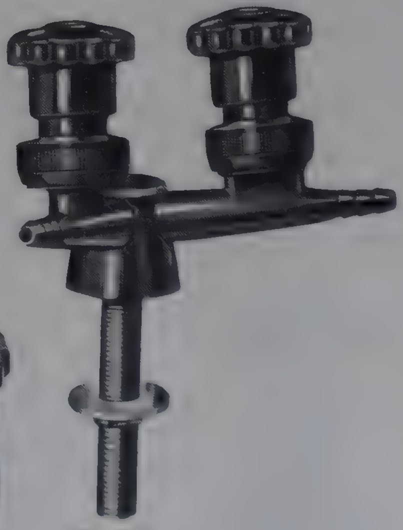
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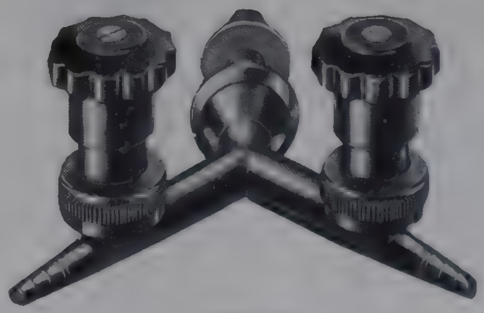
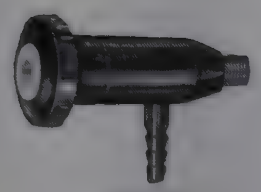
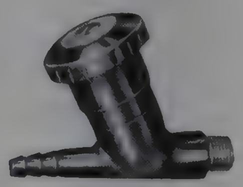

FV-748

All items on this page normally available from stock.

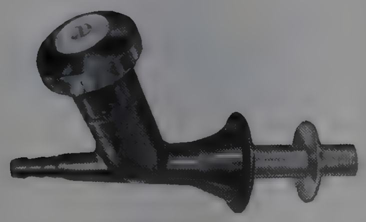
COMPRESSED AIR AND STEAM VALVES



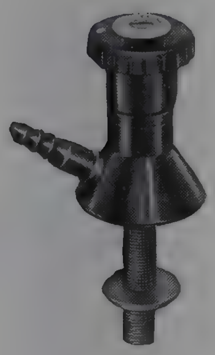
FV-756
FV-757



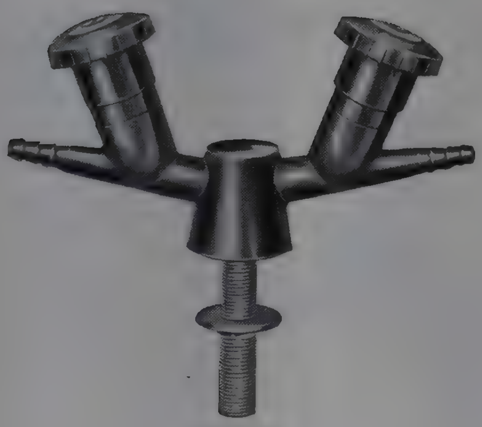
FV-758
FV-759



FV-760



FV-761
FV-762



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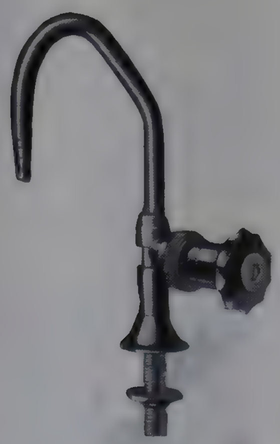

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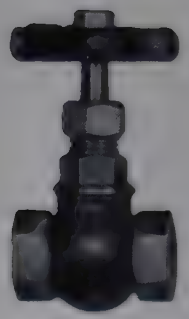


FV-765

PIPE MOUNTING

FV-756

COMPRESSED AIR ANGLE VALVE, inlet ¼ in male, outlet serrated nozzle. Ten **£34·00** Each **£3·80** c

FV-757

STEAM ANGLE VALVE, inlet ¼ in male, outlet serrated nozzle ... Ten **£34·00** Each **£3·80** c

FV-758

COMPRESSED AIR IN-LINE VALVE, inlet ¼ in male, outlet serrated nozzle. Ten **£32·00** Each **£3·60** c

FV-759

STEAM IN-LINE VALVE, inlet ¼ in male, outlet serrated nozzle ... Ten **£32·00** Each **£3·60** c

VERTICAL SURFACE MOUNTING

FV-760

COMPRESSED AIR VALVE, inlet ¼ in male, outlet serrated nozzle ... Ten **£41·00** Each **£4·60** c

BENCH MOUNTING

FV-761

COMPRESSED AIR VALVE, inlet ¼ in male, outlet serrated nozzle ... Ten **£35·00** Each **£3·90** c

FV-762

STEAM VALVE, inlet ¼ in male, outlet serrated nozzle. Ten **£35·00** Each **£3·90** c

FV-763

COMPRESSED AIR VALVE, two-way, inlet ¼ in male, outlets serrated nozzles set 180° apart. Ten **£76·00** Each **£8·40** c

FV-764

STEAM VALVE, swan-neck standard, inlet ¼ in male, outlet serrated nozzle. (A = 4 in) (B = 4½ in). Ten **£60·00** Each **£6·60** c

Dimension code see page 328.

SERVICE STOPCOCK

FV-765

GLOBE VALVES, bronze, fitted removable disks in asbestos composition, suitable for steam, air, oil or water. Working pressure 200 lbf/in² (14 kgf/cm²).

Screwed female ends	¼	⅜	½	¾	1 in
Each	**£2·10**	**2·10**	**2·70**	**3·70**	**5·60**

All items on this page normally available from stock.

FRONT CONTROLLED SERVICE FITTINGS

Combined control handwheel and outlet nozzle suitable for front panel mounting.

FV-771

GAS COCK, inlet ¼ in female. Integral serrated nozzle mounted on 4×2½ in back plate.
Ten **£46·00** Each **£5·10** c

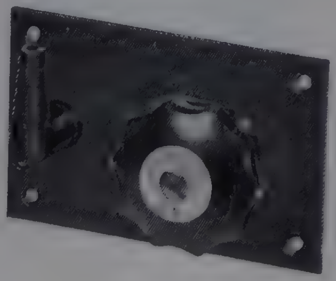
FV-772

VACUUM DIAPHRAGM VALVE, inlet ¼ in female. Integral serrated nozzle mounted on 4 in×2½ in back plate.
Ten **£62·00** Each **£6·80** c

FV-773

COMPRESSED AIR NEEDLE VALVE, inlet ¼ in female. Integral serrated nozzle mounted on 4×2½ in back plate ... ... Ten **£64·00** Each **£7·00** c

FV-771



FV-772
FV-773

Extended spindle type, adjustable for lengths 20 to 30 in. Cocks and valves complete with black bench bearing bush, handwheel and coloured service insert.

FV-774

WATER TAP, inlet and outlet ½ in female.
Ten **£35·00** Each **£3·90** c

FV-774

FV-775

STEAM VALVE, inlet and outlet ¼ in female.
Ten **£60·00** Each **£6·60** c

FV-776

GAS COCK, inlet and outlet ¼ in female.
Ten **£33·00** Each **£3·70** c

FV-775
FV-777
FV-778

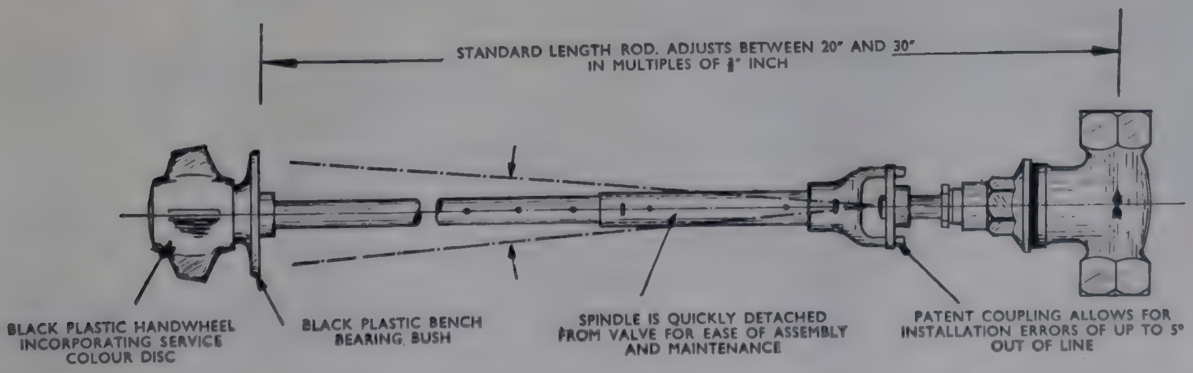
FV-777

VACUUM DIAPHRAGM VALVE, inlet and outlet ¼ in female ... ... Ten **£43·00** Each **£4·80** c

FV-776

FV-778

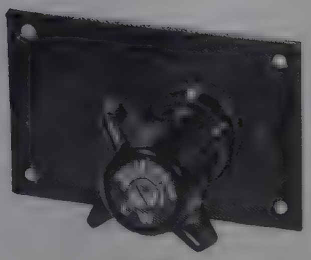
COMPRESSED AIR NEEDLE VALVE, inlet and outlet ¼ in female ... Ten **£56·00** Each **£6·20** c

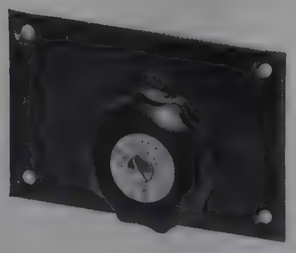

STANDARD LENGTH ROD. ADJUSTS BETWEEN 20" AND 30" IN MULTIPLES OF ⅛" INCH
BLACK PLASTIC HANDWHEEL INCORPORATING SERVICE COLOUR DISC
BLACK PLASTIC BENCH BEARING BUSH
SPINDLE IS QUICKLY DETACHED FROM VALVE FOR EASE OF ASSEMBLY AND MAINTENANCE
PATENT COUPLING ALLOWS FOR INSTALLATION ERRORS OF UP TO 5° OUT OF LINE

All items on this page normally available from stock.

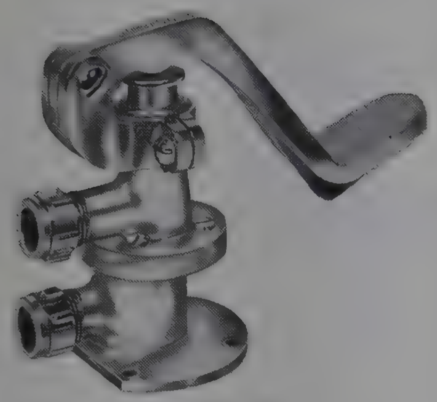
FRONT CONTROLLED SERVICE FITTINGS

Pipe connection type for front panel mounting


FV-779


FV-780
FV-781

FV-782
FV-783


FV-784

FV-779

WATER FITTING, inlet ½ in BSP male, outlet ½ in BSP female, mounted on 4×2½ in back plate.
Ten **£46·00** Each **£5·10** c

FV-780

STEAM VALVE, inlet and outlet ¼ in female, mounted on 4×2½ in back plate. Ten **£59·00** Each **£6·60** c

FV-781

COMPRESSED AIR NEEDLE VALVE, as FV-780.
Ten **£59·00** Each **£6·60** c

FV-782

GAS COCK, inlet and outlet ¼ in female, mounted on 3¼×2½ in back plate. Ten **£34·00** Each **£3·80** c

FV-783

VACUUM DIAPHRAGM VALVE, inlet and outlet ¼ in female, mounted on 4×2½ in back plate.
Ten **£55·00** Each **£6·20** c

FV-784

WATER FITTING, cold or hot, foot pedal operated. Self closing non-concussive valve. Flange drilled for floor or panel fixing. Inlet and outlet at back of valve has unions for ½ in copper tube. Chromium plated finish.
Each **£6·70** *mN*

NOZZLES FOR FRONT CONTROLLED SERVICE FITTINGS

Swan-necks and nozzles colour coded to match disk inserts on control heads.
When ordering the service should be specified for the correct colour to be supplied.

FV-790

FV-794

FV-793

FV-791
FV-792

FV-795

FV-790

SWAN-NECK, bench mounting, inlet ½ in male, for use with front control water fittings. Inlet ¼ in male for steam fittings ... Ten **£34·00** Each **£3·80** c

FV-791

SWAN-NECK, vertical mounting, inlet ½ in male, for use with front control water fittings. Inlet ¼ in male for steam fittings ... Ten **£33·00** Each **£3·70** c

FV-792

SWAN-NECK, vertical mounting, as FV-791 but having 4½ in standout. Ten **£33·00** Each **£3·70** c

FV-793

SWAN-NECK, vertical mounting, fold down movable swan-neck. Inlet ½ in male. ... ... Each **£9·10** c

FV-794

NOZZLE, bench mounting, inlet ¼ in male for use with front control gas, air and vacuum fittings.
Ten **£18·00** Each **£2·00** c

FV-795

NOZZLE, vertical mounting, inlet ¼ in male, for use with front control gas, air and vacuum fittings.
Ten **£15·50** Each **£1·75** c

Items on this page normally available from stock except those coded *N*.

GAS FITTINGS

FV-801

LEVER HANDLE COCK (pipe mounting).

Screwed	$\frac{1}{8}$	$\frac{1}{4}$ in male	
Ten	£8·40	8·80	c
Each	£0·94	0·98	

FV-802

VERTICAL MOUNTING COCK, single way. Inlet $\frac{1}{4}$ in male. Serrated nozzle outlet.
Ten **£20·50** Each **£2·30** c

FV-803

VERTICAL MOUNTING COCK, two way. Inlet $\frac{1}{4}$ in male. Serrated nozzle outlets 90° apart.
Ten **£31·00** Each **£3·50** c

FV-804

TWO WAY LEVER HANDLE COCK (pipe mounting). Inlet $\frac{1}{4}$ in male. Serrated nozzle outlets 90° apart.
Ten **£25·50** Each **£2·85** c

FV-805

SINGLE BENCH COCK. Inlet $\frac{1}{4}$ in male. Serrated nozzle outlet. Colour code lever and base flange.
Ten **£21·50** Each **£2·40** c

FV-806

TWO WAY BENCH COCK. Inlet $\frac{1}{4}$ in male. Serrated nozzle outlets 90° apart. Colour code lever and base flange ... ... Ten **£28·50** Each **£3·20** c

FV-807

TWO WAY BENCH COCK. As FV-806 but nozzles 180° apart .... Ten **£28·50** Each **£3·20** c

FV-808

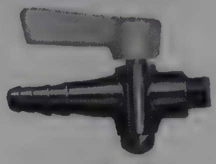
THREE WAY BENCH COCK. Inlet $\frac{1}{4}$ in male. Serrated nozzle outlets 120° apart. Colour code lever and base flange ... ... Ten **£36·00** Each **£4·00** c

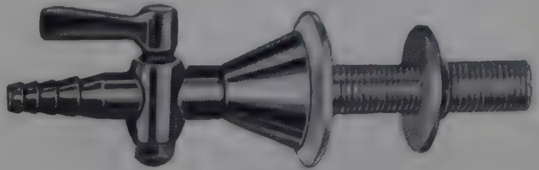
FV-809

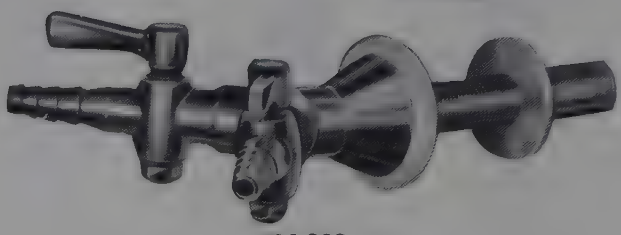
THREE WAY BENCH COCK. Inlet $\frac{1}{4}$ in male. Serrated nozzle outlets 90° apart. Colour code lever and base flange ... ... Ten **£36·00** Each **£4·00** c

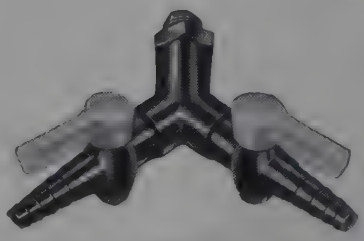
FV-810

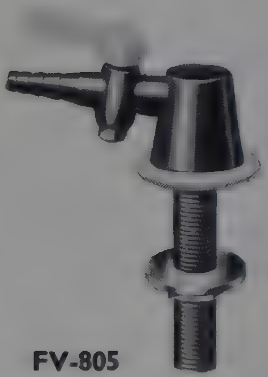
FOUR WAY BENCH COCK. Inlet $\frac{1}{4}$ in male. Serrated nozzle outlets 90° apart. Colour code lever and base flange ... ... Ten **£44·00** Each **£4·90** c

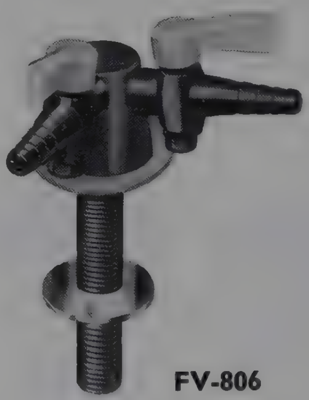

FV-801

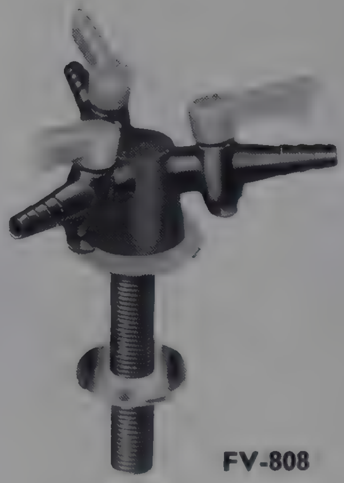

FV-802

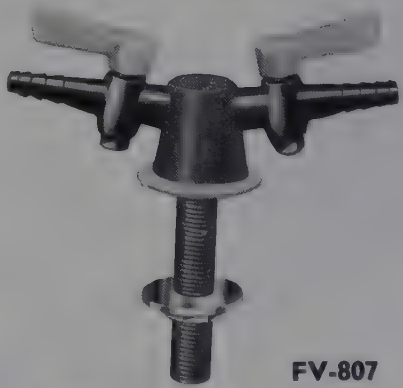

FV-803


FV-804


FV-805


FV-806


FV-808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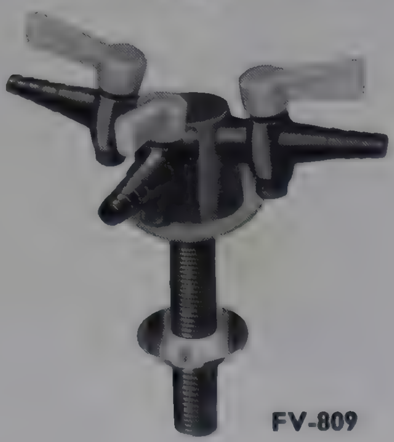
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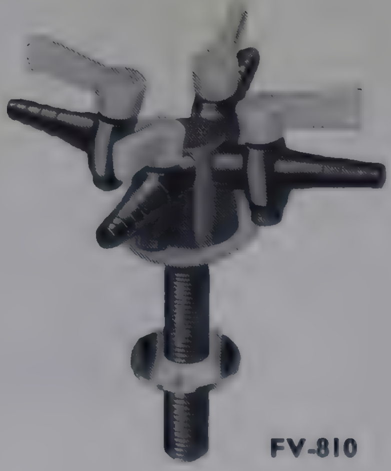

FV-810

All items on this page normally available from stock.

GAS FITTINGS

SAFETY DROP FAN TAPS

FW-816

FW-818

FV-816
GAS COCK, pipe mounting, single way, drop lever, screwed $\frac{1}{4}$ in male... Ten **£10·60** Each **£1·18** c

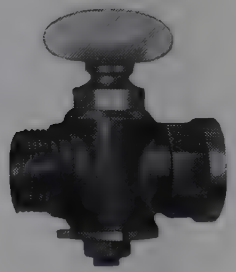
FV-817
GAS COCK, bench mounting, single way, drop lever, screwed $\frac{1}{4}$ in female. Ten **£20·00** Each **£2·25** c

FV-818
GAS COCK, bench mounting, two way, 90° drop lever, screwed $\frac{1}{4}$ in female. Ten **£30·00** Each **£3·40** c

FV-819
GAS COCK, bench mounting, as FV-818 but three way, cocks 90° apart. Screwed $\frac{1}{4}$ in female.
Ten **£37·00** Each **£4·10** c

FV-820
GAS COCK, bench mounting, as FV-818 but four way, cocks 90° apart. Screwed $\frac{1}{4}$ in female.
Ten **£45·00** Each **£5·00** c

GAS CONTROL COCKS



FV-825

FV-825
GAS STOPCOCKS, brass.

Screwed	$\frac{1}{2}$	$\frac{3}{4}$	1 in	
Each	**£1.50**	**£1.60**	**£2.70**	c

GAS BURNERS

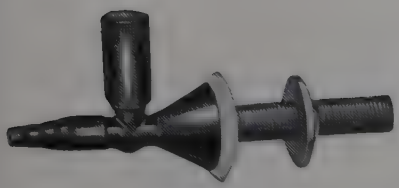
A selection of Bunsen, Meker, Teclu, Fishtail Micro and Ring burners will be found under the following entries in List No. sequence.

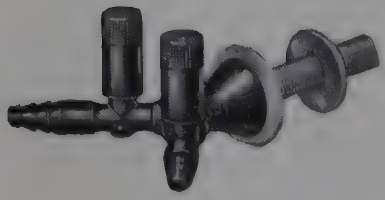
For Town (Coal) Gas BX-020 to BX-095	**For Natural (Methane) Gas** BX-220 to BX-305
For Liquified Petroleum (Bottled) Gas BX-420 to BX-485	**For Liquid Fuel** BX-750 to BX-800

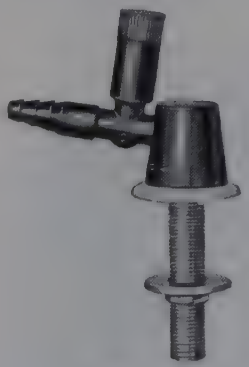
All items on this page normally available from stock.

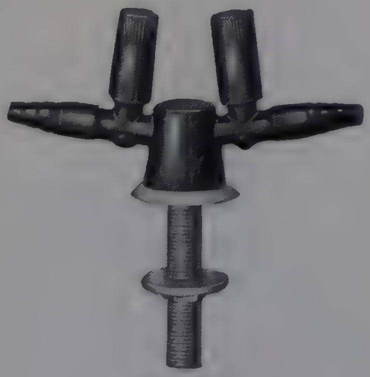
BOTTLE GAS NEEDLE VALVES

For bottled and pressure gases


FV-826


FV-827


FV-828


FV-829

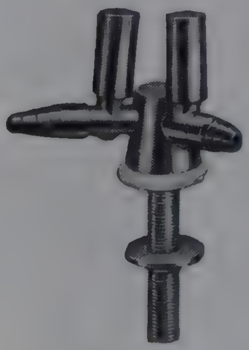
FV-826
VERTICAL MOUNTING VALVE, single way. Inlet $\frac{1}{4}$ in male, serrated nozzle outlet. Colour code base flange.
Ten **£30·00** Each **£3·40** c

FV-827
VERTICAL MOUNTING VALVE, two way. Inlet $\frac{1}{4}$ in male, serrated nozzle outlets 90° apart. Colour code base flange ... ... Ten **£43·00** Each **£4·80** c

FV-828
SINGLE BENCH VALVE. Inlet $\frac{1}{4}$ in male, serrated nozzle outlet. Colour code base flange.
Ten **£31·00** Each **£3·50** c

FV-829
TWO WAY BENCH VALVE. Inlet $\frac{1}{4}$ in male, serrated nozzle outlets 180° apart. Colour code base flange ... ... Ten **£43·00** Each **£4·80** c

FV-830
TWO WAY BENCH VALVE. Inlet $\frac{1}{4}$ in male, serrated nozzle outlets 90° apart. Colour code base flange ... ... Ten **£43·00** Each **£4·80** c


FV-830

BOTTOGAS LABORATORY GAS SUPPLY

BOTTOGAS is commercial butane which is suitable for Bunsen burners and other laboratory equipment. Supplied in steel containers which, fully charged, hold 32 lb of liquid, the gas can be drawn off in quantities as required. Low pressure gas is drawn off through a reducing valve for normal laboratory use, automatically delivering the gas at a pressure of 11 in w.g.

FV-930
CONTAINER, *Bottogas*, steel, 13 in dia. × 23 in high, with diaphragm type gunmetal stop valve complete with 32 lb charge of liquid. Including initial hire charge.
Each **£4·25** *fN*

REPLACEMENT PART AND ACCESSORIES

FV-932	**Refill,** *Bottogas*, for FV-930. Empty container must be returned carriage paid for this service to be provided.	Each	**£1·55**	*fN*
FV-935	**Valve,** pressure reducing, with union to fit container valve and with connection for $\frac{1}{4}$ in copper tube.	Each	**£1·80**	*f*
FV-936	**Nozzle adapter,** for high pressure gas supply.	Each	**£0·50**	*f*
FV-937	**Pipe,** copper, $\frac{1}{4}$ in o.d.	Per foot	**£0·15**	*f*
FV-938	**Clips and pins,** for FV-937. In pack of 12.	Pack	**£0·13**	*f*
FV-939	**Junction fitting,** for pipe, with wall plate.	Each	**£0·50**	*f*
FV-940	**Union,** brass, $\frac{1}{4}$ in	Each	**£0·13**	*f*
FV-941	**Tee,** brass, $\frac{1}{4}$ in	Each	**£0·20**	*f*
FV-942	**Elbow,** brass, $\frac{1}{4}$ in	Each	**£0·15**	*f*

Cylinders are hired to users in the United Kingdom, and the hire charge is included in the price of FV-930. No subsequent hire charge is made if empty cylinders are returned for refilling (FV-932). It is uneconomical for cylinders to be shipped to overseas customers, who are advised to contact a local distributor for their supply and maintenance. We will gladly arrange an introduction if so required.

INSTALLATION. Bottogas is very penetrating, and only the gas valves listed above and $\frac{1}{4}$ in external dia. copper tubing with compression joints should be used. Butane-proof rubber tubing should be used between nozzles and burners.

Physical properties of Bottogas. Specific gravity of vapour 1·91 (air = 1). Air required for complete combustion 30 ft^3 per ft^3 of gas. Gross calorific value, 3200 Btu/ft:. Net calorific value, 2880 Btu/ft:.

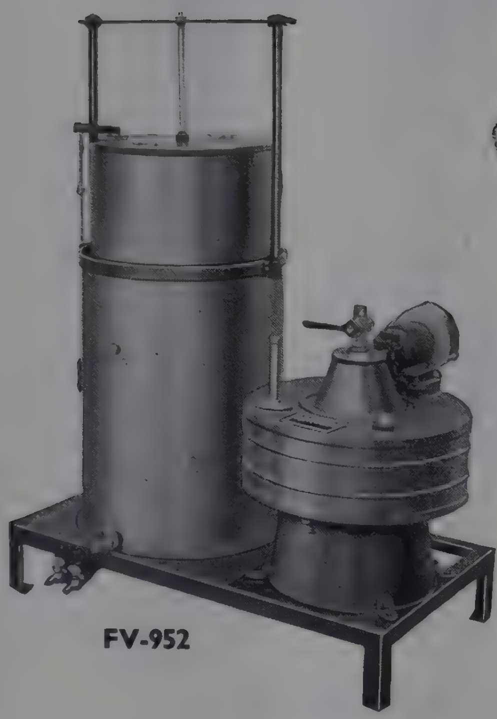
FV-930

Items on this page normally available from stock except those coded *N*.

PETROL-AIR GAS GENERATORS

The gas is generated from petrol (gasoline) having a specific gravity of between 0·68 and 0·72. The generated gas has a calorific value of 300 Btu/ft³.

FV-950



FV-952

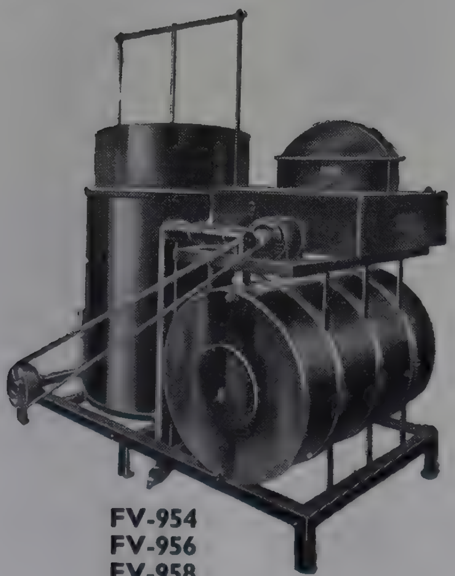
FV-950

GENERATOR, PETROL-AIR GAS, portable, electrically driven. The ideal unit for a small laboratory, having a capacity of up to 20 Bunsen burners (100 ft/³h). Being very light in weight (35 lb empty) it can readily be transported to wherever gas is required, providing that a mains electricity point is available. When gas is not required, the motor should be switched off. Should the motor be left running when gas is not being used, petrol will not be consumed and no gas will be generated. Overall dimensions 1 ft 9 in dia. × 2 ft high. (Approx. shipping space 7 ft³). For single phase a.c. supplies only. Each **£78·25** *f*

FV-952

GENERATOR, PETROL-AIR GAS, portable, automatic, electrically driven. This generator is ideal for installations where the load is small and varied or intermittent. Similar to FV-950 but with air holder and automatic control for self-starting and stopping in accordance with the demand for gas. Capacity of up to 20 Bunsen burners (100 ft³/h). Overall dimensions 3 ft 4 in wide × 1 ft 10 in deep × 4 ft 2 in high. (Approx. shipping space 45 ft³). For single phase a.c. supplies only.

Each **£169·00** *f*



FV-954
FV-956
FV-958

GENERATOR, PETROL-AIR GAS, automatic, electrically driven. Fuel for approximately 10 hours continuous running at maximum output is carried in a tank fitted with a contents gauge and a filler-plug of ample size. An adjustable metering device delivers fuel at a controlled rate to a rotating archimedian spiral running in a water seal in the pump case. Gas is delivered under pressure to the gas holder which is fitted with a mercury switch controlling the motor. Gas pressure may be adjusted to a maximum of 5 in water gauge. The generator is fully automatic in operation, stopping and starting with the rise and fall of the gas holder. All demands are met instantaneously, the motor being switched on when the contents of the gas holder are low, and off when the gas holder is full. The proportion of gas to air is always stable and is quite unaffected by load changes or climatic conditions. By varying the rate of flow of fuel, the mixture can be controlled. This enables the requirements of any particular process to be met.

List No.	Size	Capacity Bunsen burners	Capacity ft³/h	Approximate overall dimensions W	D	H	Packed for shipment (approx. ft³)	Size of motor	Gas main pipe	Each ex works, unpacked	
										£	
FV-954	2	40	200	5 ft 4 in	3 ft 0 in	4 ft 3 in	80	¼ hp	1 in	**273·75**	*f*
FV-956	3	60	300	5 ft 4 in	3 ft 4 in	4 ft 8 in	97	¼ hp	1¼ in	**305·80**	*f*
FV-958	4	120	600	5 ft 8 in	3 ft 7 in	5 ft 0 in	120	¼ hp	1½ in	**458·05**	*f*

When ordering please state voltage and nature of supply. The prices given are for single phase a.c. supplies only. Three phase machines can be supplied at extra cost, and details will be provided on request.

PUMPS

For laboratory service line installations

AIR PUMP

Large capacity—Low pressure

Fitted with an air inlet filter and an internal relief valve ensuring constant pressure on any varying load within the capacity of the machine. Direct coupled to protected type motor wound for single or three phase a.c. or d.c.

FV-972

AIR PUMP, rotary, maximum capacity 8·4 m³/hr (300 ft³/hr), maximum pressure 0·2 or 0·35 kgf/cm² (3 or 5 lbf/in²). Nominal speed 930 rev/min. Floor space occupied 560×230 mm. Inlet and outlet approx. 19 mm o.d. Power rating max. 300W.

For 200/250V 50 Hz single phase supplies. Each **£118·00** *m*

For 380/420V 50 Hz three phase supplies. Each **£116·00** *m*

FV-976

AIR PUMP, rotary, maximum capacity 20 m³/hr (720 ft³/hr), maximum pressure 0·2 or 0·35 kgf/cm² (3 or 5 lbf/in²). Nominal speed 720 rev/min at 0·2 kgf/cm² and 930 rev/min at 0·35 kgf/cm². Floor space occupied 670×325 mm. Inlet and outlet approx. 35 mm o.d. Power rating max. 550W.

For 200/250V 50 Hz single phase supplies. Each **£135·00** *m*

For 380/420V 50 Hz three phase supplies. Each **£122·00** *m*

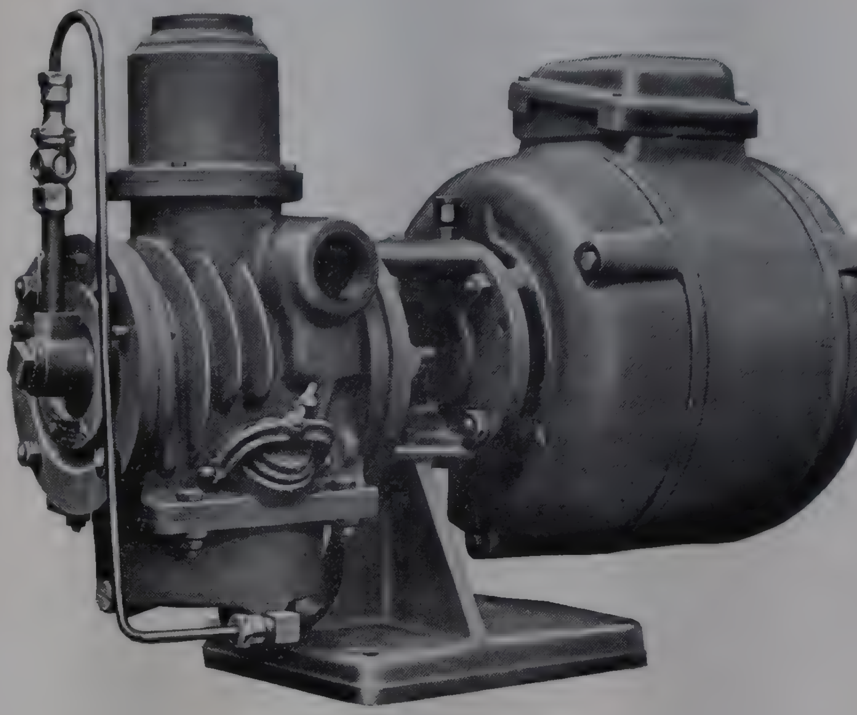
FV-978

AIR PUMP, rotary, maximum capacity 33 m³/hr (1200 ft³/hr), maximum pressure 0·35 kgf/cm² (5 lbf/in²). Nominal speed 730 rev/min. Floor space occupied 780×340 mm. Inlet and outlet approx. 35 mm o.d. Power rating max. 780W.

For 200/250V 50 Hz single phase supplies. Each **£157·00** *m*

For 380/420V 50 Hz three phase supplies. Each **£144·00** *m*

When ordering FV-972, FV-976 or FV-978 please state voltage and frequency of supply.



FV-972

VACUUM PUMP

Large capacity—High vacuum

For the evacuation of pipeline systems equipped with vacuum service points and designed for automatic operation.

The unit comprises a gas ballasted pump mounted on a horizontally positioned cylindrical reservoir. The drying tank has a demountable end plate which gives access to a desiccant tray normally filled with anhydrous sodium hydroxide. Dimensions of tank, length 58 cm, diameter 24 cm, overall width with feet, 31 cm.

The unit incorporates a vacuum switch which can be adjusted to switch off the pump at any pressure down to 5 torr and to switch on as the pressure rises; the tank pressure being a constant within 15 torr. A magnetic air isolation/admission valve is fitted.

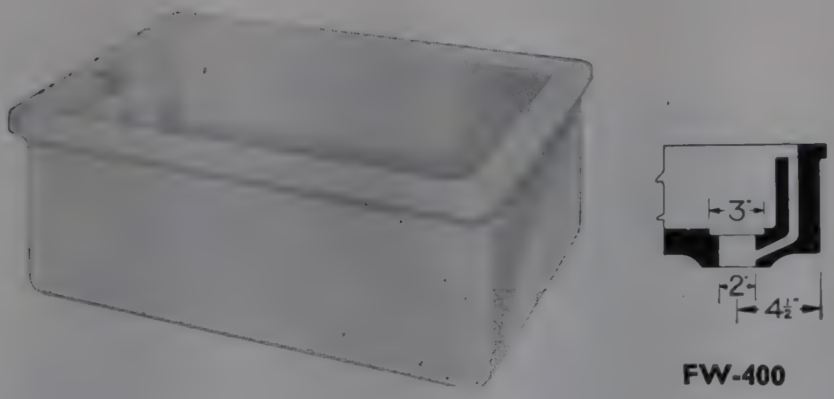
The unit can serve an average of 10 open points at a time but it may be connected to a maximum of 24 points according to the conditions.

FV-984

VACUUM PUMP, pipeline, *Edwards,* **Type 150TA,** as specification, for a maximum of 24 points.
For 220/240V 50 Hz single phase supplies. Each **£306·00** *f*

FV-984

SINKS



FW-400

FW-400

SINKS, white vitreous glazed fireclay, with ½ in rim projection all round, and 3 in flanged outlet with combined open weir overflow in centre at one end. White inside and out.

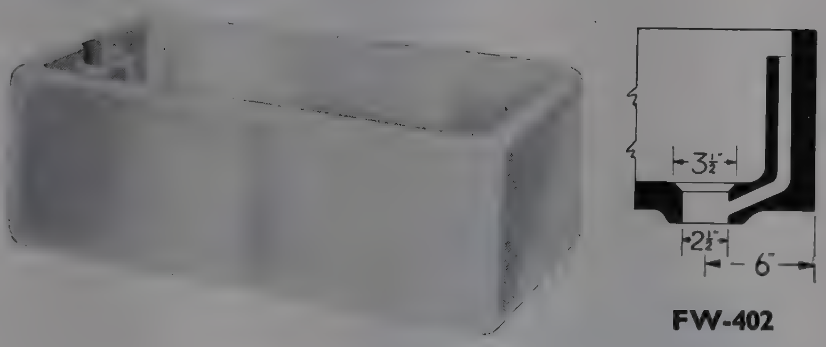
Overall sizes. Length and width measured under rim.

Size	8×6×6	10×8×6	12×10×6 in	
Each	**£4·23**	**4·23**	**4·23**	*m*
Size	12×12×6	16×11×6	17×13×6 in	
Each	**£4·63**	**4·63**	**4·63**	*m*
Size	20×12×6		23×14×8 in	
Each	**£4·63**		**7·45**	*m*

ACCESSORY

FW-401 Straps, metal, to support sinks FW-400 up to size 17×13×6 in ... ... Pair **£0·80** *m*

Sinks larger than 17×13×6 in should be supported on wood bearers or stools. Full details and prices on application.



FW-402

FW-402

SINKS, white vitreous glazed fireclay, with 3½ in chamfered outlet and combined open weir overflow in centre at one end. White inside and out. Overall sizes.

Size	18×15×8	21×16×8	24×16×8 in	
Each	**£4·77**	**6·00**	**6·15**	*m*
Size	24×18×8		30×18×8 in	
Each	**£6·45**		**11·85**	*m*
Size	21×16×10	24×16×10	24×18×10 in	
Each	**£7·17**	**7·17**	**7·75**	*m*
Size	27×18×10	30×18×10	30×20×10 in	
Each	**£10·00**	**11·85**	**12·93**	*m*
Size	36×18×10	36×20×10	36×24×10 in	
Each	**£14·10**	**14·75**	**19·37**	*m*
Size	42×24×10		36×24×12 in	
Each	**£25·25**		**25·25**	*m*

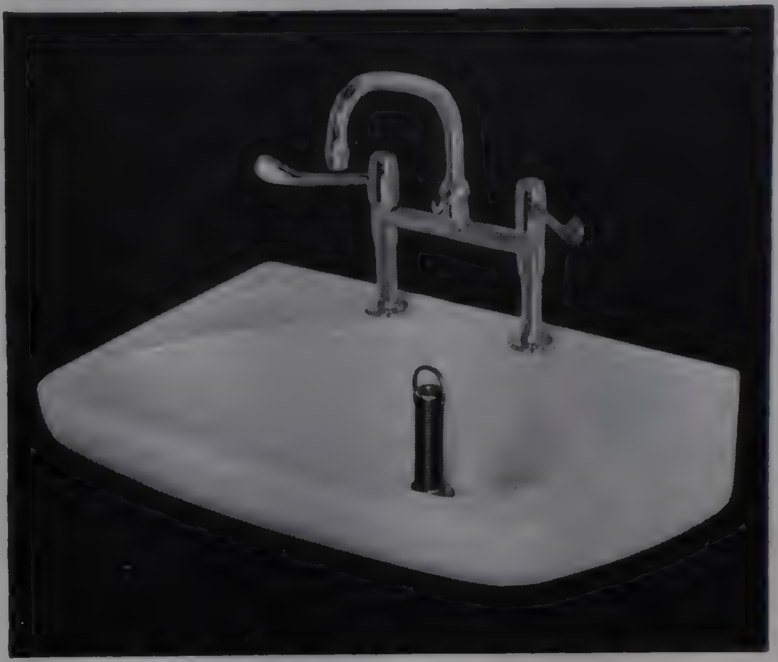
FW-403

FW-403

SINK, white vitreous glazed fireclay inside and out, with roll edge and 6 in high back skirting having holes for wall fixing. Outlet 3½×2½ in at centre rear. Size 12×9×7 in ... ... Each **£9·00** *m*

All items on this page normally available from stock.

WASH-HAND BASIN



FW-406 to FW-410

FW-406

WASH-HAND BASIN, white vitreous glazed china, 26×18 in, with left-hand soap dish and recessed outlet ... ... Each **£10·45** *m*

FW-407

CANTILEVER BRACKETS, set of two, semi-concealed, cast iron, to screw on to wall ... ... Set **£2·10** *m*

FW-408

WASTE OUTLET, 1¼ in, chromium plated brass, with standing tube ... ... Each **£3·45** *m*

FW-409

BOTTLE TRAP, 1¼ in, chromium plated brass. Each **£2·85** *m*

FW-410

WATER STANDARD, swan-neck, for mixing hot and cold water. ½ in male inlets at 8 in centres, antisplash outlet. Wrist action lever handles. Chromium plated brass ... ... Each **£16·30** *m*

STAINLESS STEEL SINKS

FW-411

SINK BOWLS, seamless, pressed from 20 gauge FDP material. Internal corners radiused. Top edges have a 1 in wide flat flange all round. Satin polished finish inside and on face of flanges. All bowls have waste sinkage at the back centre, except size 9×14×7 in where it is centrally placed. Complete with 1½ in stainless steel outlet, plug, chain, and integral overflow, except for size 9×14×7 in which has a 1½ in stainless steel waste plug and chain only.

Size	9×14×7	17×14×7	20×14×7	21×15×8 in	
Each	**£14·50**	**16·00**	**17·00**	**18·10**	*m*

Stainless steel sink and draining board assemblies can also be supplied. Sizes range from 3 ft 6 in×1 ft 6 in to 8 ft×1 ft 9 in. Sinks can also be supplied in pairs for washing and rinsing, with or without draining boards. Full details and prices on application.

FW-411

RECEIVERS

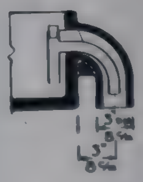
FW-420

RECEIVERS, vitreous glazed fireclay, white inside and out. With polythene siphon insert, and integral fireclay outlet horn.

External size	11×11×11	13×13×13 in	
Each	**£8·83**	**10·10**	*m*

FW-421

Spare polythene siphon tube ... Each **£0·90** *m*

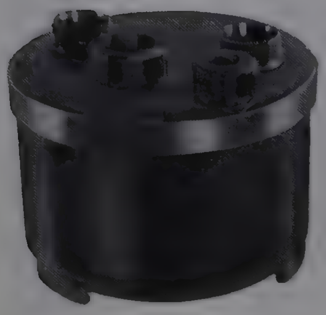


FW-420

All items on this page normally available from stock.

RECEIVERS AND SINK FITTINGS

All the polythene plumbing fittings have connections with a special Kauthene buttress type thread unless otherwise indicated. The standard size 1¼ in and 1½ in Kauthene thread will not match BSP screwed fittings; the appropriate Kauthene fitting must be used. Hot jointing of polythene pipe to the connectors is easily effected by use of fusion tools FW-514 and FW-515.


FW-424

FW-424

CATCHPOT RECOVERY TRAP AND DILUTION RECEIVER, black polythene, 1¾ gallon capacity. Two inlets and single outlet screwed 1½ in Kauthene thread; complete with blank cap on one outlet. Suitable inlet and outlet connectors also adapter for 1¼ in thread available on request, see FW-426 to FW-429.
Each **£5·63** *m*

FW-426
FW-427

FW-426

LOOSE NUT SOCKET INLET, black polythene, for pipe connection, screwed 1½ in Kauthene thread ... Each **£0·25** *m*

FW-427

LOOSE NUT SOCKET INLET, black polythene, for pipe connection, screwed 1¼ in Kauthene thread ... Each **£0·23** *m*

FW-428

FW-428

COUPLER REDUCER, black polythene, 1½ in to 1¼ in.
Each **£0·25** *m*

FW-429

ELBOW, black polythene, 90°, screwed 1½ in Kauthene thread.
Each **£0·35** *m*

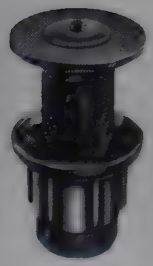
FW-429

FW-436

WASTE OUTLET, black polythene, 3 in diameter flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1¼ in Kauthene thread, excluding pipe connector. Suitable for sinks FW-400 ... ... Each **£0·43** *m*

FW-437

WASTE OUTLET, black polythene, 3½ in diameter chamfered flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1½ in Kauthene thread, excluding pipe connector. Suitable for sinks FW-402 ... ... Each **£0·50** *m*


FW-436
FW-437

FW-484

WASTE OUTLET, black polythene, 3½ in diameter flange, complete with stopper, strainer and backnut. Short type for use with 'thin section' vessels, unslotted and may be drilled for slot on site. Screwed 1½ in Kauthene thread, excluding pipe connector.
Each **£0·43** *m*

All items on this page normally available from stock.

DRIP WASTES

FW-492

DRIP WASTE, black polythene, with 3 in diameter flange; complete with strainer and backnut but excluding pipe connector. Screwed 1¼ in Kauthene thread ... ... Each **£0·63** *m*

FW-494

DRIP WASTE, black polythene, with 4 in circular flange; complete with removable anti-splash top to retain rubber or polythene tubes. Fitted large backnut but excluding pipe connector. Screwed 1½ in Kauthene thread ... ... Each **£0·77** *m*

FW-495

DRIP WASTE, black polythene, circular with 6 in square flange. Complete with strainer and large backnut but excluding pipe connector. Screwed 1½ in Kauthene thread ... Each **£2·37** *m*

FW-496

DRIP WASTE, black polythene, oval cup overall 8 in × 4 in. Complete with strainer and retaining clips but excluding pipe connector. Screwed 1½ in Kauthene thread ... Each **£1·50** *m*

FW-497

DRIP CUP, black polythene, oval cup with rectangular flange overall 8 in × 4 in. Complete with strainer and retaining clips but excluding pipe connector. Screwed 1½ in Kauthene thread. Each **£1·60** *m*

FW-498

DRIP WASTE, bronze, screwed 1¼ in having 4½ × 2½ in oval cup. Each **£3·70** c

FW-499

DRIP WASTE, bronze, screwed 1½ in having 7 × 3 in oval cup. Each **£5·00** c

FW-492

FW-494

FW-495

FW-496
FW-497

FW-498
FW-499

WASTE DISPOSAL

Waste Bins

WD-400	Capacity 50 litres
WD-425	Capacities 35 to 90 litres

Waste Sack Holders

WD-440	Sack capacity 30 litres; mobile holder
WD-441	Sack capacity 30 litres; wall mounting holder
WD-450	Sack capacity 60 litres; wall mounting holder
WD-455	Sack capacity 60 litres; mobile holder

For full details and prices see entries in List No. sequence.

All items on this page normally available from stock.

DRIP WASTES AND PIPE

FW-500
FW-502

FW-500

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet **loose nut** coupler screwed 1¼ in Kauthene thread, outlet coupler screwed 1½ in Kauthene thread ... Each **£1·17** *m*

FW-501

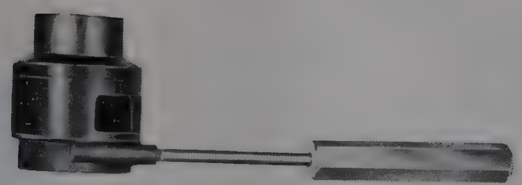
WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet with **fixed nut** coupler screwed 1¼ in BSP thread, outlet coupler screwed 1½ in Kauthene thread ... ... Each **£1·07** *m*

FW-502

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet and outlet fitted **loose nut** couplers, screwed 1½ in Kauthene thread. Each **£1·20** *m*

FW-503

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity 1 pint. Inlet with **fixed nut** coupler screwed 1½ in BSP thread, outlet coupler 1½ in Kauthene thread ... ... Each **£1·13** *m*



FW-514
FW-515

FW-514

FUSION TOOL, for hot jointing of polythene pipe to couplers, 1¼ in size ... ... Each **£1·45** *m*

FW-515

FUSION TOOL, as above, but 1½ in size. Each **£2·00** *m*

FW-516

PIPE, black polythene, normal gauge, internal diameter 1¼ in. Supplied cut to length required up to a maximum of 15 ft ... ... Foot **£0·13** *m*

FW-518

PIPE, black polythene, as FW-516 but internal diameter 1½ in ... ... Foot **£0·13** *m*

BENCH TROUGHS AND BOTTLE RACKS

FW-530

FW-530

BENCH TROUGH, island type, ¼ in thick rigid unplasticised PVC; colour red or grey (state which required). Dimensions 36 in long × 4 in wide internally; 2 in high × 4 in high at stop end with recessed hole to accommodate waste outlet. Not including waste outlet. Each **£10·75** *fN*

TROUGHS, as above, can be supplied to alternative lengths as required; also, where specified, with back skirting for wall mounting. Price on application.

FW-532
FW-534

FW-532

WINCHESTER QUART BOTTLE RACK, ¼ in thick rigid unplasticised PVC; colour red or grey (state which required). To fit 3 ft wide cupboard and having two 6 in upstands ... ... Each **£14·50** *fN*

FW-534

WINCHESTER QUART BOTTLE RACK, as FW-532 but to fit 3 ft 6 in wide cupboard ... Each **£17·75** *fN*

RACKS, as above, can be supplied to alternative lengths, as required. Price on application.

Items on this page normally available from stock except those coded *N*.

DRAINING BOARDS AND RACKS

FW-550

PEG DRAINING RACKS. Polythene coated metal frame with sloped pegs. Angled fitting members support the racks 1 in away from the wall surface.

Size	22×22	25×22 in	
Each	**£4·50**	**5·20**	*m*

FW-554

PEG DRAINING RACKS. Teak, with seventeen sloped pegs.

Size	24×15	30×24 in	
Each	**£5·10**	**7·15**	*m*

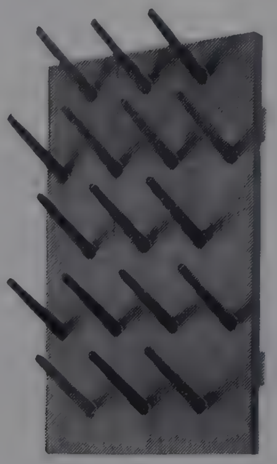
FW-558

DRAINING BOARDS. Teak, grooved.

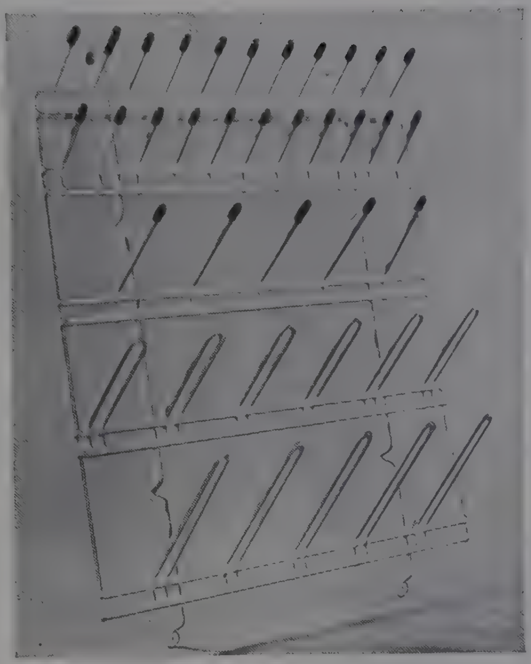
Size	24×18	30×21	36×24 in	
Each	**£4·80**	**6·20**	**8·10**	*m*

FW-570

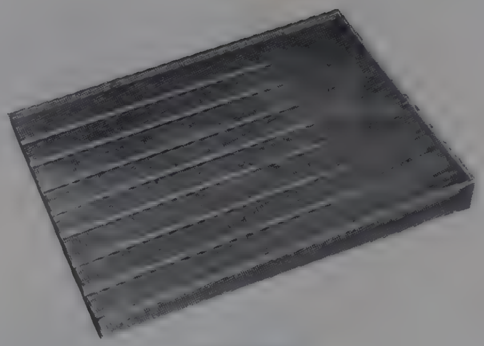
MAT, draining, polythene, for use on bench or draining board. Reduces glassware breakage. Size 44×35 cm. Each **£0·60** *m*



FW-554



FW-550



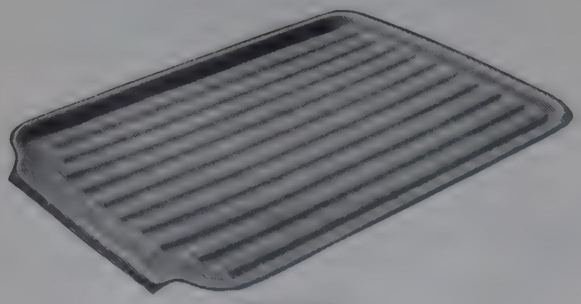
FW-558

Gallenkamp
REGD. TRADE MARK

DRAINING AND DRYING APPARATUS

WD-170 **WD-174**	Draining racks, polythene coated steel, for wall mounting.
WD-200	Glassware dryer, single point, electrically heated.
WD-215	Glassware dryer, 12 point, electrically heated.

For full details and prices see entries in List No. sequence.



FW-570

MATS asbestos millboard, for bench protection, see AR-472 in List No. sequence.

All items on this page normally available from stock.

WATER HEATERS

WK-620

WK-620
WATER HEATER, gas heated, output approximately 3 litres/min.

WK-640
WATER HEATER, gas heated, output approximately 10 litres/min.

WK-670
WATER HEATER, electrically heated, storage pattern, capacity approximately 9 litres. To serve one or more taps.

WK-760
WATER HEATER, electrically heated, storage pattern, single outlet, capacity approximately 22 litres.

For full details and prices of the above see entries in List No. sequence.

LABORATORY ACCESSORIES

FW-630

FW-635

FW-630
SAFE, wall fitting, bent steel welded body having lugs on the back. The bolt shoots behind the front rebate and the ¼ in thick door is hung on concealed pivots. Suitable for storage of platinum crucibles. External dimensions, 8¾ in wide × 4⅛ in deep × 3⅛ in high.
Each **£7·53** *m*

FW-631
SAFE, wall fitting, as FW-630, but with a ⅜ in thick door. External dimensions, 8¾ × 4⅛ × 6¼ in high.
Each **£11·85** *m*

FW-635
BLACKBOARDS, oak framed, with specially prepared black writing surface on hardboard ground. Fitted with chalk trough.

Width	36	36	48 in
Height	24	36	36 in
Each	£7·75	8·50	11·00 *m*

Writing surfaces can also be prepared from pigmented glass, with fine sandblast surface. Details and price on application.

FW-636
BLACKBOARD, 6 ft wide × 13 ft high overall. Two oak framed boards with black writing surfaces as FW-635, counterpoised in two stiles. Fitted with chalk trough.
... Each **£74·00** *mN*

FW-637
CARD FRAME, 3 × 1¾ in, made from black plastics. Suitable for labelling drawers and cupboards. Complete with 2¾ × 1 in white cards and black fixing screws. In pack of 10 ... ... 10 packs **£4·70** Pack **£0·52** *c*

FW-638
WALL CLOCK, electric, silver grey metal case having 9 in dial and sweep second hand. For 200/250V a.c. single phase supply ... ... Each **£8·50** *m*

FW-640
WALL CLOCK, battery driven automatic, with 9 in dial, similar appearance to FW-638. Operated by a standard No. 2 flash lamp battery normally lasting nine months ... ... Each **£11·25** *m*

FW-637

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11

FW-638

Items on this page normally available from stock except those coded *N*

LABORATORY SAFETY EQUIPMENT

FW-642

POISON CUPBOARD, of timber construction, for storage of poisons and dangerous drugs. In accordance with the requirements of BS 2881, 2 ft 7 in high × 2 ft 4 in wide × 11 in deep. Top inclined at angle of 30°. Outside and inside finished white cellulose lacquer. Interior fitted with full width shelf, covered Melamine plastics and two adjustable shelves of clear plate glass. An inner compartment, independently locked, is provided for storage of dangerous drugs, in accordance with the Dangerous Drug Regulations, and sited at lower left corner of cupboard. Each cupboard is fitted with three standard small bayonet cap lampholders to provide internal lighting and a red glass dome let into the roof as a warning light signal. All lights controlled by door operated switches. It is intended that 15W lamps be used and provided by the user. The internal wiring terminates in a 3 pole terminal block mounted inside the cupboard; a hole suitable for $\frac{3}{4}$ in conduit is provided for connection to the electricity supply ... ... Each **£53·00** *m*

FW-644

POISON CUPBOARD, as above, but 2 ft 7 in high × 1 ft 6 in wide × 11 in deep ... ... Each **£44·00** *m*

FW-646

SAFETY SCREEN, 2 ft 3 in wide × 2 ft 6 in high, of $\frac{1}{4}$ in transparent Technoplate, mounted in grey enamelled steel frame ... ... Each **£14·50** *mS*

FW-642

PROTECTIVE CLOTHING

CP-705 to CP-720	**Aprons**	For details and prices see entries in List No. sequence.
CP-740 to CP-750	**Laboratory coats** ...	
CP-770 to CP-810	**Gloves**	
CP-835 to CP-890	**Eye protection**	
CP-898 to CP-920	**Respirators**	

FW-646

FIRE PRECAUTION

FF-300 to FF-400	**Fire extinguishers** ...	For details and prices see entries in List No. sequence.
FF-440	**Asbestos blanket** ...	
FF-460	**Fire bucket**	

FIRST AID

FF-820 to FF-840	**First-aid cabinets** ...	For details and prices see entries in List No. sequence.

Items on this page coded S normally available from stock.

TECHNOLITE

TECHNOLITE is a form of opaque vitreous glass with a finely polished surface. It is unaffected by the action of all alkalis and organic substances and all acids, with the exception of hydrofluoric acid. It is particularly suitable for use as a covering for reagent bottle shelves and the tops and backs of titration benches. In certain specialised cases, such as in food testing and bacteriological laboratories, it is effective as a bench top.

Technolite is supplied in both white and black and in thicknesses of $\frac{5}{16}$ in; the maximum size of a single sheet is 8 × 4 ft. When it is intended for use as a bench top the maximum size of any single sheet should not exceed 3 ft to 4 ft in width, so as to reduce the risk of fracture through strain or impact. Technolite should be protected by an asbestos mat where a burner or hotplate is being used.

FW-650

TECHNOLITE, rectangular sheet, white $\frac{5}{16}$ in thick.
Price on application. *m*

FW-652

TECHNOLITE, rectangular sheet, black $\frac{5}{16}$ in thick.
Price on application. *m*

NOTE: When enquiring or ordering, it is essential to supply details of dimensions of the material and the nature of the edgework required. This can be either: edges as cut, edges ground square, edges ground square and polished or edges rounded and polished. Combinations of this edgework can also be made on any one sheet or number of sheets.

Prices on application.

TECHNOPLATE

TECHNOPLATE is exactly as Technolite in appearance and has all of its advantages, but with the added property of being able to withstand both considerable impact and heat. It is a toughened vitreous material and can be supplied either black or transparent. Its main use is in bases for fume cupboards (black) and safety screens (transparent). It is also used for bench tops for specialised work as described for Technolite, but with obviously greater advantages. **Once manufactured, Technoplate cannot be cut or altered.** The maximum size of a single sheet is 5 ft × 2 ft 6 in.

There is a tendency during processing for the sheets to warp slightly and where several sheets are butted together to form one large bench top there is a certain amount of difficulty in obtaining perfectly flush joints and some caulking with mastic is often required. Bench tops of this material perform well under arduous conditions and heavy corrosion, but one must be prepared to accept this small disadvantage which cannot be avoided.

FW-654

TECHNOPLATE, rectangular sheet, transparent, $\frac{1}{4}$ in thick.
Price on application. *m*

FW-655

TECHNOPLATE, rectangular sheet, black, $\frac{5}{16}$ in thick.
Price on application. *m*

FW-656

TECHNOPLATE, rectangular sheet, black, $\frac{3}{8}$ in thick.
Price on application. *m*

This material is supplied normally with the edges arrised only unless otherwise stated. It may be supplied with edgework as for Technolite where this is required.

AE-082

ADHESIVE, *Bostick,* **'C'.** A powerful general purpose black adhesive. Suitable for Technolite and Black Technoplate. Supplied in tin containing 10 fl oz.

For price see entry in List No. sequence.

ASBESTOLITE

ASBESTOLITE is a grey coloured material, being a compound of asbestos and cement. It is of high tensile strength, fire resisting and incombustible. In its natural state, Asbestolite is resistant to normal spillage of diluted acids and most organic solvents and when coated with a suitable solution will resist most acids and alkalis. It is extensively used for fume cupboard and combustion hood bases and backs, also for laboratory bench tops, glass blowing tables and purposes where protection against heat is required.

Asbestolite is now available in two distinct grades to meet a wider field of application. Grade A is suitable for evenly distributed temperatures only, up to approx. 300°C; this is shown under FW-680 and FW-682. Grade B may be used in temperatures up to at least 800°C: this is shown under FW-690.

FW-680

ASBESTOLITE SHEETS, Grade A, 8 ft 3 in × 4 ft, natural finish. Tensile strength 4200 lbf/in². For evenly distributed temperatures only, up to approx. 300°C.

Thickness	$\frac{1}{8}$ 3	$\frac{3}{16}$ 4·5	$\frac{1}{4}$ 6	$\frac{3}{8}$ in 9 mm	
Each	**£6·50**	**8·00**	**9·50**	**12·50**	*m*
Thickness	$\frac{1}{2}$ 12·5	$\frac{5}{8}$ 16	$\frac{3}{4}$ 19	1 in 25 mm	
Each	**£14·00**	**18·00**	**21·50**	**27·00**	*m*

FW-682

ASBESTOLITE SHEETS, 8 ft 3 in × 4 ft, as above but anti-acid treated finish.

Thickness	$\frac{1}{8}$ 3	$\frac{3}{16}$ 4·5	$\frac{1}{4}$ 6	$\frac{3}{8}$ in 9 mm	
Each	**£11·00**	**12·50**	**13·50**	**17·00**	*m*
Thickness	$\frac{1}{2}$ 12·5	$\frac{5}{8}$ 16	$\frac{3}{4}$ 19	1 in 25 mm	
Each	**£19·00**	**22·50**	**25·50**	**30·00**	*m*

The standard size sheet is 8 ft 3 in × 4 ft but panels can be supplied cut to any size required, within the dimensions of the sheet. Rebating, cutting out of sink holes, small squares, disks or rings can be carried out to order. Where sheet sizes or bench tops are required longer than a standard sheet, these must be made up from more than one sheet. Thicknesses of $\frac{3}{4}$ in and 1 in material can be supplied with rebated joints. Joints can be pointed with FV-370 cement.

FW-690

ASBESTOLITE SHEETS, Grade B, 8 ft 3 in × 4 ft, natural finish. May be used in temperatures up to at least 800°C. For use where high or concentrated temperatures are present and suitable for use as palettes. Compression strength 7100 lbf/in² minimum.

Thickness	$\frac{1}{4}$ 6	$\frac{5}{16}$ 8	$\frac{3}{8}$ in 9 mm	
Each	**£13·50**	**16·50**	**22·00**	*m*

Thickness	$\frac{1}{2}$ 12·5	$\frac{5}{8}$ 16	$\frac{3}{4}$ 19	1 in 25 mm	
Each	**£24·00**	**30·00**	**39·00**	**50·00**	*m*

FV-370

CEMENT, for jointing Asbestolite piping and bench tops, fireclay and stoneware troughs and pipes, etc. Supplied in a tin with a separate tin of solvent solution, and full directions for use. For details and price see entry in List No. sequence.

GAS ANALYSIS

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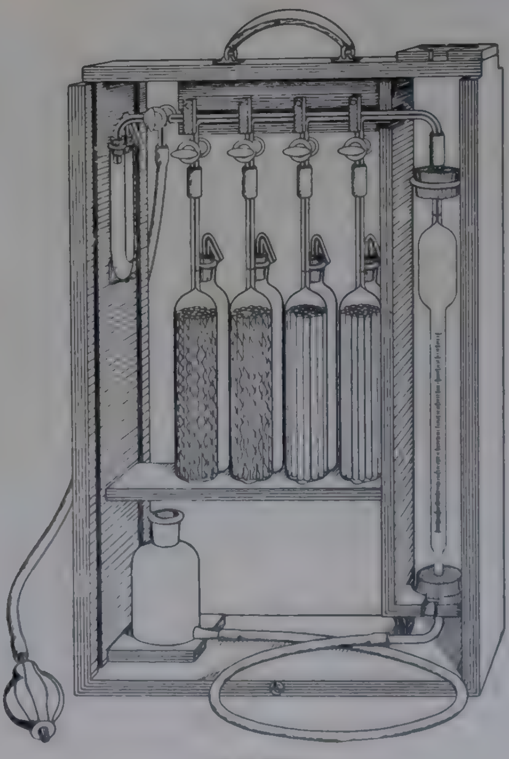
Gallenkamp ORSAT GAS ANALYSER

REGD TRADE MARK

BRITISH STANDARD PATTERN as described in BS 1756 Part 2
'Sampling and analysis of flue gases'

GC-020
GAS ANALYSER, Orsat, *Gallenkamp*, to BS 1756 Part 2, for the determination of CO, CO_2 and O_2 in flue gases, etc. With burette GC-030, two absorption vessels GC-040, and two absorption vessels GC-042, in portable polished wood case with removable front and back. Dimensions 53 × 37 × 16·5 cm ... ... Each **£30·50** *b*


GC-020

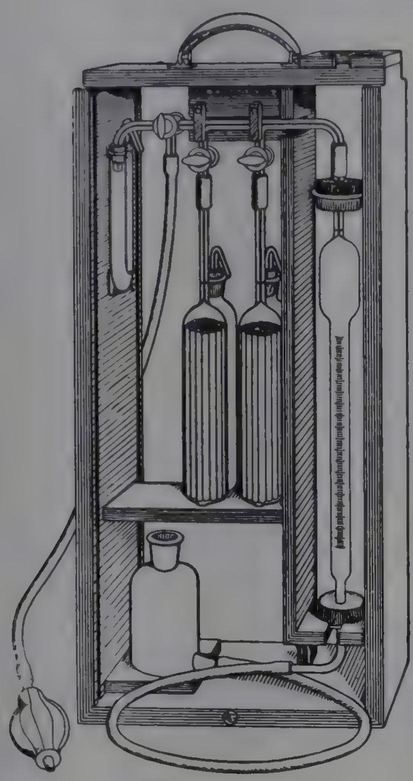
REPLACEMENT PARTS for GC-020 only

Please note that these parts are not suitable for use with Orsat analysers GC-100 to GC-120.

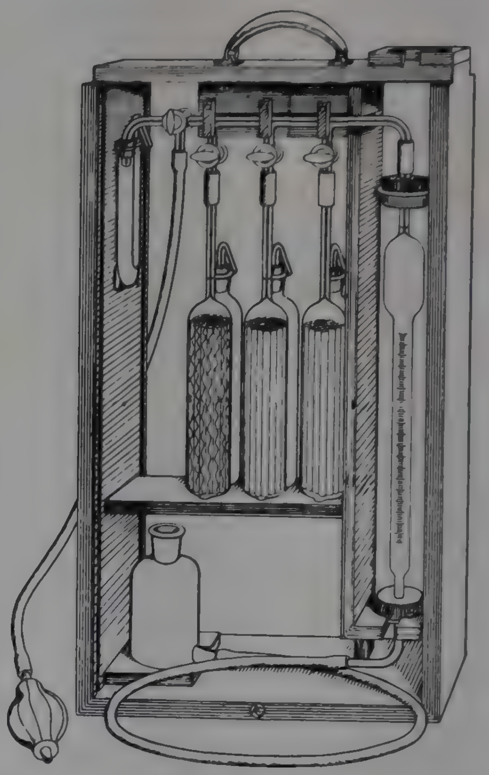
GC-030	**Burette,** *Technico*, Class A, capacity 100 cm^3, with 70 cm^3 in the bulb and 30 cm^3 in the tube which is graduated in 0·2 cm^3	Each	£2·55	*a*
GC-034	**Burette jacket** for burettes GC-030.	Each	£0·75	*a*
GC-040	**Absorption vessel,** filled with thin wall glass tubes.	Each	£2·00	*a*
GC-042	**Absorption vessel,** as GC-040 but for use with cuprous chloride absorbent, each glass tube containing a spiral of copper wire	Each	£2·20	*a*
GC-044	**Stopcock manifold,** with four side stopcocks, and T-bore end stopcock	Each	£5·85	*a*
GC-046	**Levelling bottle,** 125 ml	Each	£0·50	*m*

All items on this page normally available from stock.

Gallenkamp ORSAT GAS ANALYSERS



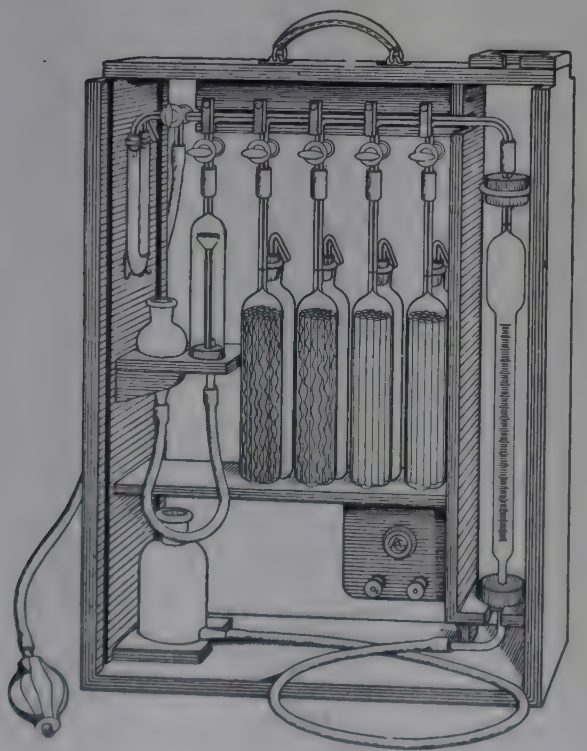
GC-100



GC-110

GC-100

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO_2 and O_2 in flue gases, etc. With burette and two absorption vessels, GC-170 with filling tubes GC-171, in portable polished wood case with removable front and back. Dimensions 58×28×16·5 cm. **See Note below** ... ... Each **£21·00** *b*



GC-120

GC-110

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO_2 and O_2 and the approximate estimation of CO in flue gases, etc. With burette, three absorption vessels GC-170, 2 sets of filling tubes GC-171 and 1 set GC-173, in portable polished wood case with removable front and back. Dimensions 60×34×16·5 cm. **See Note below** ... ... Each **£24·50** *b*

GC-120

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO, CO_2, O_2 and H_2 in flue gases, etc. With four absorption vessels GC-170, with 2 sets of filling tubes GC-171 for CO_2 and O_2, and 2 sets GC-173 for CO, and a Harden type slow combustion pipette GC-178 for determination of H_2, CH_4, etc., in portable polished wood case with removable front and back. With rheostat and terminals for battery connection **but without battery.** Dimensions 60×43×16·5 cm. **See Note below.**

Each **£38·50** *b*

ACCESSORY

CL-924	**Battery,** *Ever Ready* No. 126. For price see entry in List No. sequence.

NOTE: Apparatus GC-100 to GC-120 are normally supplied with burette GC-150 unless otherwise ordered. They can, on request, be supplied with any of the burettes GC-150, GC-152, GC-154 as listed on the next page. The absorption vessels for O_2 and CO_2 can also be replaced by the Shepherd type vessel with improved sintered glass distributor if required.

All items on this page normally available from stock.

Gallenkamp ORSAT GAS ANALYSERS

COMPONENT PARTS AND ACCESSORIES

for apparatus GC-100, GC-110, GC-120

GC-150
BURETTE, *Technico,* capacity 100 cm³ of which 60 cm³ is contained in the bulb and 40 cm³ in the tube graduated in 0·2 cm³ ... ... Each **£1·85** *a*

GC-151
BURETTE, *Technico,* as GC-150 but fitted with jacket GC-156 using rubber stoppers ... ... Each **£3·60** *a*

GC-152
BURETTE, *Technico,* as GC-150 but with 75 cm³ in the bulb and 25 cm³ in the tube graduated in 0·2 cm³. Each **£2·00** *a*

GC-153
BURETTE, *Technico,* as GC-152 but fitted with jacket GC-156 using rubber stoppers ... ... Each **£3·80** *a*

GC-154
BURETTE, *Technico,* cylindrical, capacity 100 cm³. With tube graduated in 0·5 cm³ over whole length. Each **£1·85** *a*

GC-155
BURETTE, *Technico,* as GC-154 but fitted with jacket GC-156 using rubber stoppers ... ... Each **£3·60** *a*

GC-156
BURETTE JACKET, (AG), for burettes GC-150, GC-152 and GC-154 ... ... Each **£0·85** *a*

GC-170
ABSORPTION VESSEL, (AG), accepts filling tubes GC-171 or GC-173. **Without filling tubes.** Each **£1·25** *a*

GC-171
FILLING TUBES, thin wall glass in a pack sufficient to fill one absorption vessel GC-170 ... Pack **£0·35** *a*

GC-173
FILLING TUBES, thin wall glass with internal copper wire spiral for use with cuprous chloride absorbent. Pack sufficient to fill one absorption vessel GC-170. Pack **£1·30** *a*

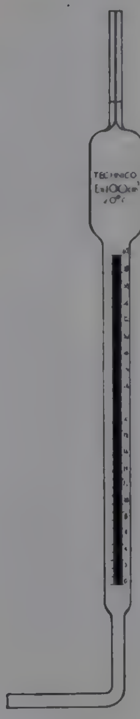
GC-176
ABSORPTION VESSEL, (AG), **Shepherd bubbling type,** with sintered glass distributor, for rapid and efficient absorption ... ... Each **£4·60** *a*

Note: This vessel may be used as an alternative for absorption of CO_2 or O_2.

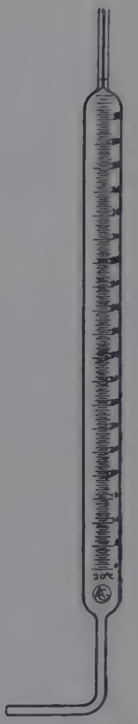
GC-178
GAS PIPETTE, Harden slow combustion, as fitted to GC-120, comprising stout vessel with rubber stopper holding both the platinum wire element with its leads, and glass tube for levelling bulb connection. Each **£2·40** *a*

GC-180
STOPCOCK MANIFOLD, (AG), for GC-100, with two side stopcocks and one T-bore end stopcock. Each **£4·75** *a*

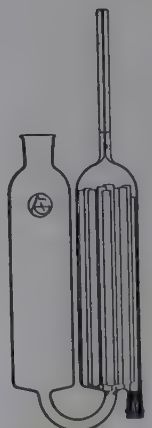
GC-182
STOPCOCK MANIFOLD, (AG), as GC-180 but for GC-110, with three side stopcocks ... Each **£5·10** *a*



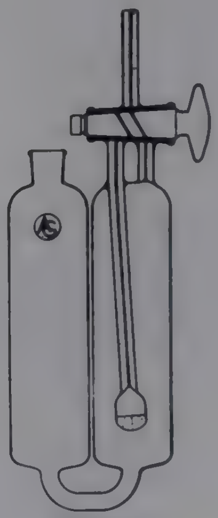
GC-150



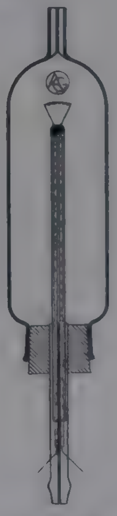
GC-154



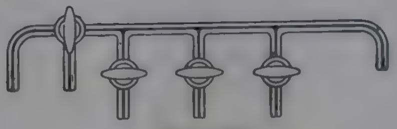
GC-170 with GC-171



GC-176



GC-178



GC-182

GC-184
STOPCOCK MANIFOLD, (AG), as GC-180 but for GC-120, with five side stopcocks ... Each **£7·20** *a*

AU-340	**Levelling bottle,** 250 ml ...	For details and prices see entries in List No. sequence.
MF-920	**Mercury reservoir,** 150 ml for GC-120	
MF-932	**Mercury,** triple distilled ...	
RV-030	**PVC bellows**	

All items on this page normally available from stock.

Gallenkamp — C.E.R.L. SULPHUR OXIDES ANALYSER

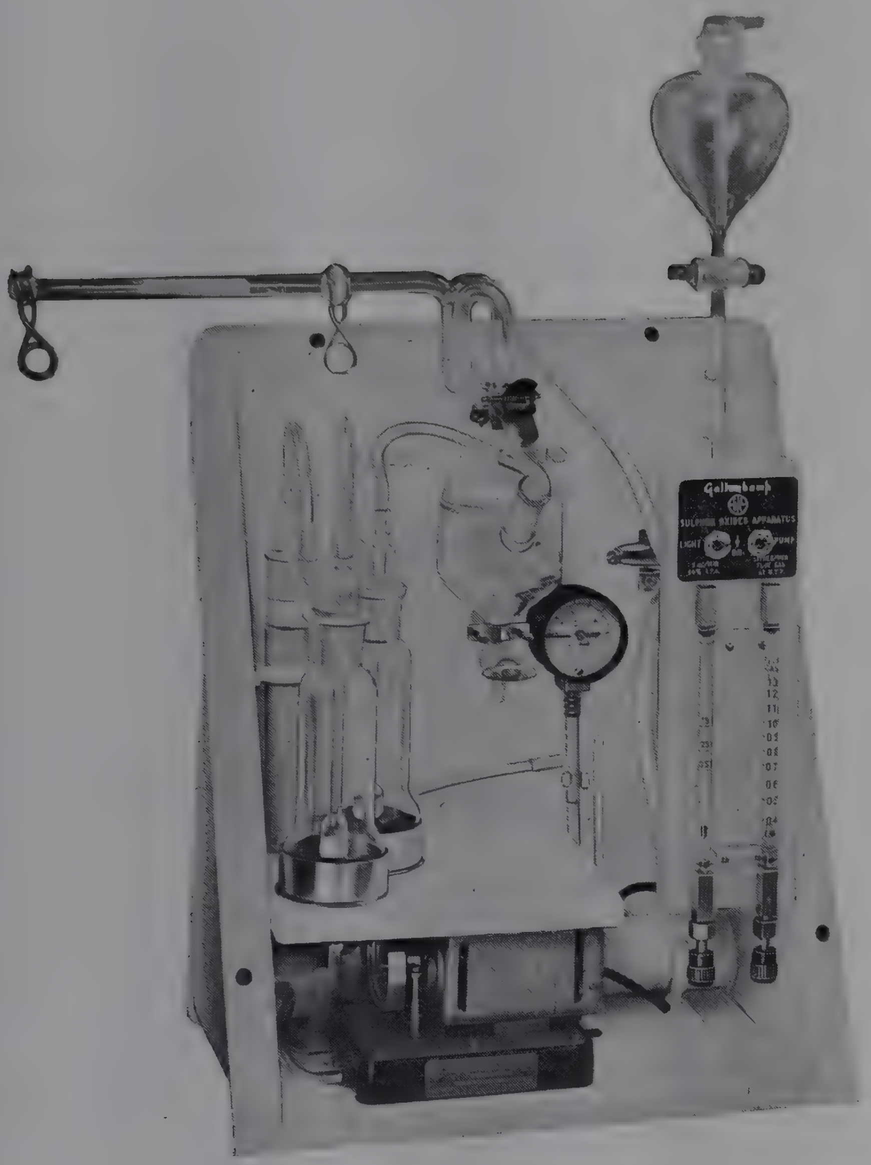
TO BS 1756 Part 4

For determinations of sulphur dioxide and sulphur trioxide in flue gases

Developed in collaboration with the Central Electricity Research Laboratories, Leatherhead, Surrey.

References

Fielder, Jackson and Raask, J. Inst. Fuel, 1960, 33, No. 229, 85.
Fielder and Morgan, Anal. Chim. Acta. 1960, 23, 538.



GC-220

GC-220

SULPHUR OXIDES APPARATUS, *Gallenkamp-C.E.R.L.*, with pump, rheostat, needle valves, pressure gauge, thermometer, all glass parts and flowmeters mounted on illuminated panel. Contained in fibreglass carrying case. With 1·5 metre stainless steel probe and one charge of *Soxazorb*. **Without heating tape, reagents or titration equipment.** For 220/240V a.c. single phase supplies ... ... Each **£125·00** g

Also available for 200/210V and 110/120V a.c. supplies to special order.

When ordering please state voltage and frequency of supply.

ACCESSORIES

HE-150	**Heating tape,** 125 cm long, 13 mm wide. Approximate loading 72W. Supplied with lead-in wire and connector; **three required for 1·5 metre probe.** For price see entry in List No. sequence.
BT-215	**Bottle, polypropylene,** wide mouth, capacity 125 ml, suitable for receiving isopropanol from absorber for titration. For details and price see entry in List No. sequence.
AR-505	**Asbestos tape,** 25 × 1·5 mm. For details and price see entry in List No. sequence.

REPLACEMENT PARTS

GC-226	**'Soxazorb'**, to absorb sulphur dioxide. Made to C.E.R.L. specification	Per kg **£6·25** m
GR-160	**Quartz wool**	For prices see entries in List No. sequence.
TJ-380	**Thermometer,** water jacket, scale span 10 to 40°C	

METHOD

Flue gas is aspirated through the apparatus by means of a diaphragm pump which is fitted with a vacuum gauge and a rheostat in the motor circuit to control the pump speed. The rate of flow of gas is controlled by a needle valve and is measured by a flowmeter calibrated 0·5 to 1·3 litres/min.

The gas is sampled through a stainless steel probe which may be heated by accessory heating tapes. After passing through a filter to remove dust, the gas is mixed with a stream of isopropanol which is controlled by a needle valve and is measured by a flowmeter. The combined flow then proceeds to a filter which separates off the isopropanol and sulphur trioxide for titration at the end of the sampling period The remaining gas passes into an iodine solution for colorimetric estimation of sulphur dioxide The final gas is washed and passed through a *Soxazorb* absorber before being pumped out of the apparatus.

SULPHUR CONTENT

of steels, coal and petroleum products

High temperature combustion can be carried out using:

FS-300 **Horizontal tube furnace,** *Gallenkamp*, **maximum temperature 1400°C.**

For full details see entry in List No. sequence.

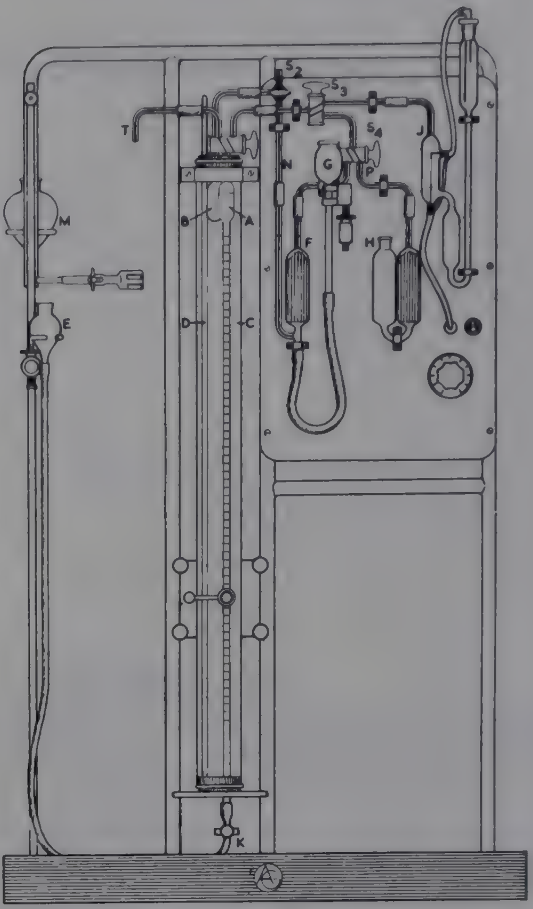
All items on this page normally available from stock.

Gallenkamp HALDANE GAS ANALYSERS

GC-300

GAS ANALYSER, Haldane, *Gallenkamp*, laboratory model, to BS 1756 Part 3, for the determination of O_2, CO_2, CO, H_2, and CH_4. All glass parts are retained by metal clips on a white plastics panel mounted on a tubular steel framework which is supported by a mercury tray. A control rheostat and mains transformer are also mounted on the panel. The burette jacket is fitted with a movable illuminated screen and reader. Screw operated adjustment to 0·05 mm is provided for the reservoirs which control the levels in the burette and potash pipette. Requires approx. 1·3 kg mercury excluding sampling tube assembly. For 200/250V 50 Hz a.c. single phase supplies. Complete with a copy of British Standard 1756 Part 3 which describes the use of the analyser but **without mercury or reagents** ... ... Each **£134·00** *b*

In the U.K. this apparatus is supplied packed in a metal frame charged at £5 which is refunded on return in good condition.



GC-300

ACCESSORY

MF-932	**Mercury, triple distilled,** suitable for gas analysers. For price see entry in List No. sequence.

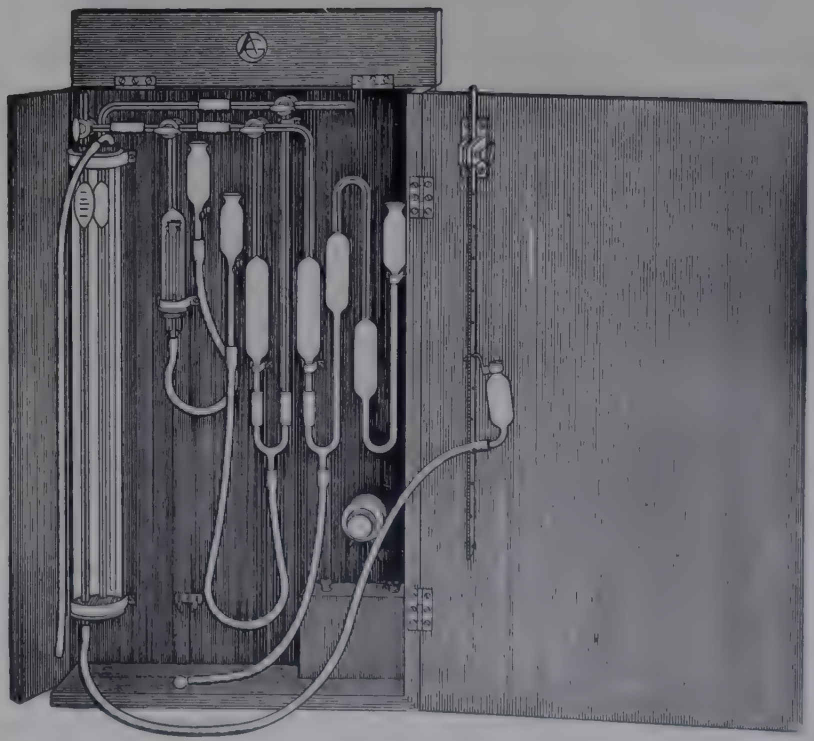
REPLACEMENT PARTS

GC-310	**Burette (A),** *Technico*, Class A, graduated 15 to 21 cm³ in 0·01 cm³ with 2·5 cm³ mark on the bulb. Each	**£16·25**	*a*
GC-312	**Compensating bulb (B),** capacity 20 ml. Each	**£1·30**	*a*
GC-314	**Water jacket (C),** for burette GC-310. Each	**£3·15**	*a*
GC-315	**Mercury reservoir (E),** 100 ml ... Each	**£0·45**	*a*
GC-316	**Absorption vessel (F),** for absorbing CO_2 in KOH, packed with glass tubes ... ... Each	**£2·70**	*a*
GC-318	**Absorption vessel (H),** for absorbing O_2 in pyrogallol, packed with glass tubes ... ... Each	**£3·15**	*a*
GC-321	**Combustion pipette (J),** with Pt element for combustion of H_2 and CH_4 ... ... Each	**£5·70**	*a*
MF-920	**Mercury reservoir (M),** for sample introduction 250 ml. For price see entry in List No. sequence.		
GC-322	**Potash reservoir (G)** ... ... Each	**£0·90**	*a*
GC-325	**Connecting piece (N)** with stopcock (S2). Each	**£2·70**	*a*
GC-326	**Connecting piece (P),** between burette, absorption vessels and combination pipette, with two oblique bore stopcocks (S3 and S4) ... ... Each	**£3·45**	*a*

For suitable Gas Sampling Tubes see GF-405 in List No. sequence.

GC-350

GAS ANALYSER, Haldane, *Gallenkamp*, a portable modified version of GC-300. Comprising 10 cm³ burette with 3 cm³ in graduated portion, and compensating vessel in water jacket, with combustion vessel, two absorption vessels, three mercury reservoirs and a guard tube. Requires approx. 1 kg mercury. With rheostat and filling tubes, in portable polished wood case, dimensions 56×38×9 cm. **Without mercury, reagents or battery** ... ... Each **£39·00** *b*



GC-350

ACCESSORY

CL-924	**Battery,** *Ever Ready* No. 126. For price see entry in List No. sequence.

All items on this page normally available from stock.

Gallenkamp LLOYD GAS ANALYSER

(Patented)

For determination of O_2, CO_2, CO, CH_4, H_2 and other gases such as C_2H_2 and N_2O

APPLICATIONS

Research and applied physiology

Respiratory gas analysis

Mine air analysis

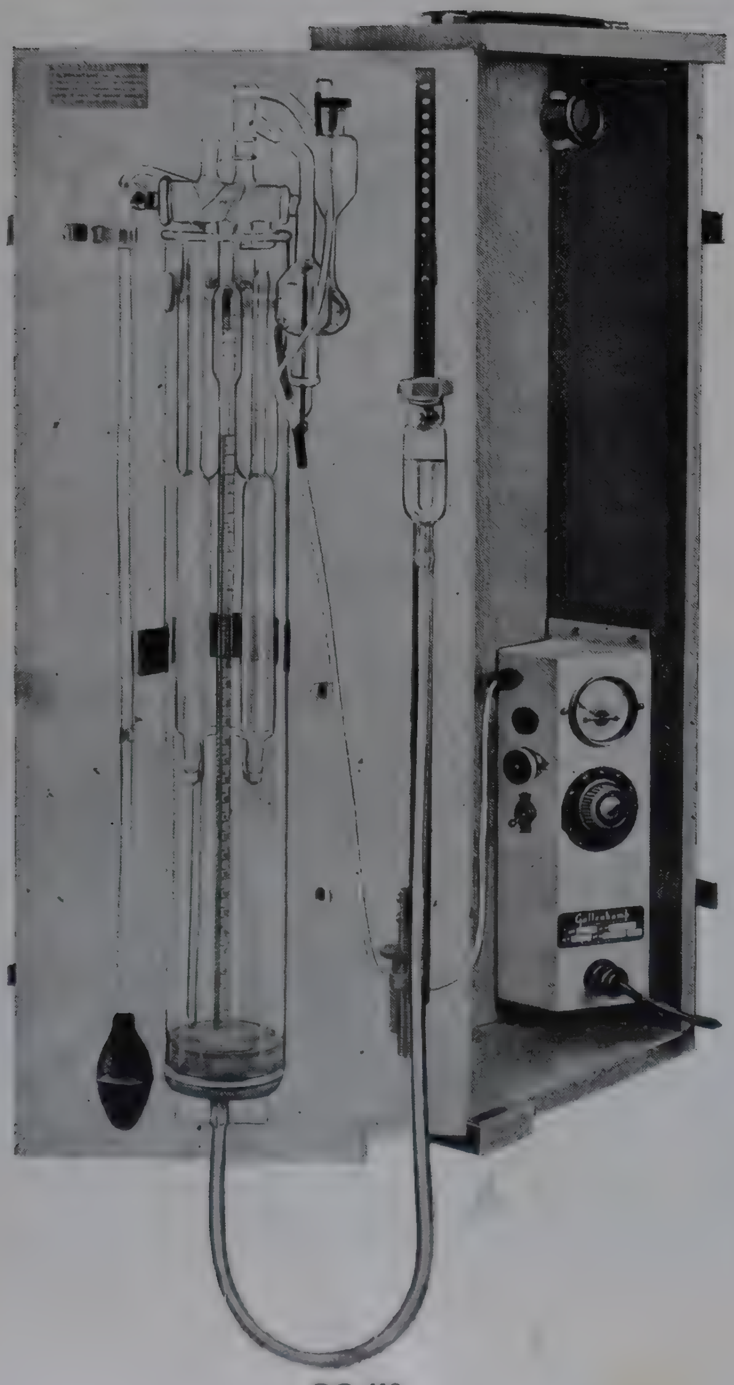
Flue gas analysis

Fuel gas analysis

Teaching of laws of chemical combination

Analysis of standard gas mixtures for calibration of automatic analysers

Calibration of blood gas electrodes



GC-412

- Rapid - complete O_2/CO_2 analysis in 6 minutes
- Suitable for BS 1756 'Sampling and analysis of flue gases'
- Accurate to 0·02% total volume
- Single stopcock operation
- Leak-free construction
- Temperature and pressure compensated
- Fully portable—easily cleaned and recharged
- Simple levelling

The Lloyd Gas Analyser is at least as accurate as traditional absorption apparatus and incorporates the following improvements:

Burette. The gas burette is calibrated from 7 to 10·1 cm^3 in 0·01 cm^3 by ring and half-ring graduations.

Single stopcock. A complete CO_2, O_2 determination may be carried out with four movements of a single large-surface stopcock. This stopcock also permits rapid washing-in of successive samples for analysis without spillage of mercury.

Leakage. The whole main working assembly is composed of a single blown glass structure without joints; leakage is therefore impossible.

Temperature and pressure compensation. The main glass part is totally immersed in a single water-jacket to keep it at a uniform temperature. A fixed mass of air is enclosed above the reagents in the reservoirs, and all readings are made with this mass of gas at constant volume. Corrections for sudden or long-term changes in ambient temperature and pressure are, therefore, not required.

Portable design. Even when charged with reagents, the analyser is convenient and safe to carry or transport.

Rapid analyses. As a result of the proximity of the reservoirs to the burette, dead space is reduced to a minimum and absorption is rapid and efficient.

Cleaning. In the event of a manipulative error, washing out of displaced reagents and, if necessary, cleaning and refilling are simple and rapid.

Levelling. This was a major drawback of the Haldane gas analysis apparatus, which involved *simultaneous* manipulation of two reservoirs, and the *simultaneous* observation of *two* meniscuses. In the Lloyd apparatus *only one* reservoir has to be moved and *only one* meniscus watched.

High concentration components:

The Lloyd Gas Analyser directly measures sample components up to 30% of total gas volume. For higher concentrations, gas samples may easily be diluted with inert gas *prepared from air*.

REFERENCES

(1) Haldane, J. S. and Graham, J. I. (1935). 'Methods of air analysis' 4th ed. London: Griffin.

(2) Lloyd, B. B. (1958). 'Development of Haldane's Gas Analysis Apparatus.' J. Physiol., 143, 5-6 p.

(3) Lloyd, B. B. (1960). British Patent Specification No. 844905 'Gas Analysis Apparatus.'

(4) Hill, D. W. (1963). 'Bull. Inst. Phys.', 14, 2.

(5) Durnin and Passmore. 'Energy, Work and Leisure', pp. 19-20. 1967. Pub. Heinemann, London.

Gallenkamp LLOYD GAS ANALYSER

(continued)

ACCESSORIES

The Lloyd Gas Analyser is supplied either with or without accessory pipettes, depending upon whether or not combustible or other gases are to be analysed in addition to oxygen and carbon dioxide. All pipettes are supplied with interchangeable ground sockets to fit the cones on the outlet tube of the main burette assembly.

The single and double absorption pipettes (GC-442 and GC-444) are for analyses in which absorbents in addition to KOH and pyrogallol are required for component gases such as carbon monoxide and unsaturated hydrocarbons.

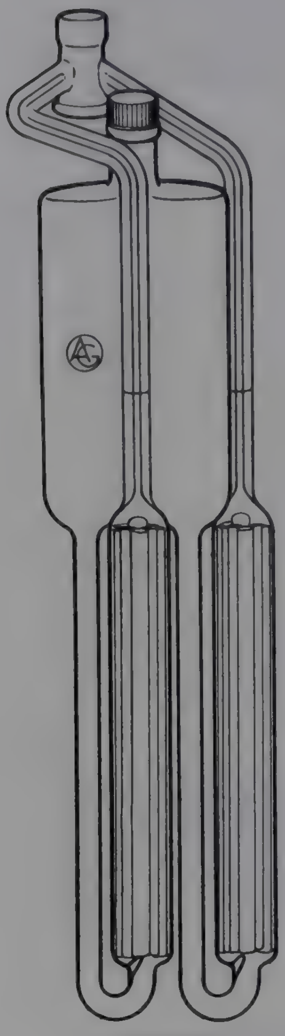
The combustion pipette (GC-452) is for analyses of gas mixtures containing combustible components such as CO, H_2 and CH_4. Rapid combustion is effected by the carefully constructed and positioned detachable platinum filament which is electrically heated via a mercury switch. A step-down mains transformer is built in to the control box but, in the absence of a mains supply an external battery may be used. In this case a battery of 4·5V to deliver 2A is required. Filament temperature is controlled by a built-in ammeter and rheostat, so that low and high temperature combustion components may be determined separately.

The combined combustion/absorption pipette (GC-454) is for analyses where some gases other than O_2 and CO_2 are to be determined by absorption and others by combustion. It is particularly applicable to estimation of unsaturated hydrocarbons in fuel gas analysis.

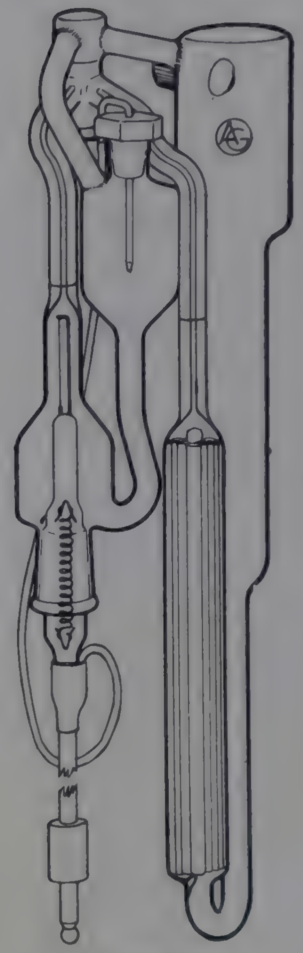
The analyser is contained in a case (with carrying handle) which acts as a stand in use. Also supplied are a sample transfer tube, a small tubular reservoir for the outlet, a magnifier-reader and a polythene cannula for the addition and removal of reagents.

Detailed operating procedure is carefully explained in the instructions manual supplied.

Gallenkamp hold the exclusive licence to manufacture and sell, as well as use the name Lloyd in connection with the Lloyd Gas Analyser. The apparatus is covered by the following patents: Great Britain 844,905, U.S.A. 2972523, Canada 629500, Japan 283681.



GC-444



GC-454

GC-400

GAS ANALYSER, Lloyd, *Gallenkamp*, as specification, for O_2 and CO_2 determinations. Complete in carrying case, but **without mercury or reagents.** Requires approximately 350 g mercury. Overall dimensions 70×25×16 cm (27½×10×6 in), weight 7 kg (16 lb). Each **£60·00** *b*

GC-402

GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including GC-442 **single** absorption pipette. Each **£75·00** *b*

GC-404

GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including GC-444 **double** absorption pipette. Each **£80·00** *b*

GC-412

GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including GC-452 combustion pipette and electrical controls. Requires approximately 500 g mercury. Each **£90·00** *b*

GC-414

GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-412 but with GC-454 combined combustion/absorption pipette in place of combustion pipette ... ... Each **£115·00** *b*

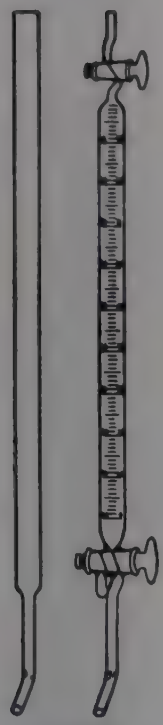
REPLACEMENT PARTS

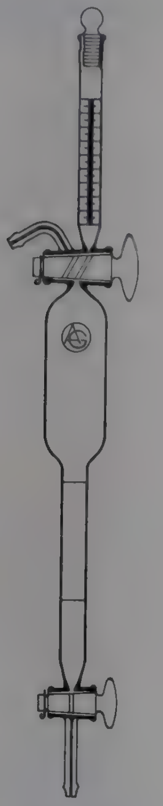
GC-430	**Burette assembly,** comprising a borosilicate glass burette with 5-way stopcock and absorption vessels in one unit, assembled complete with rubber stopper in water jacket	Each	**£41·00**	*a*
GC-442	**Absorption pipette, single**	Each	**£14·00**	*a*
GC-444	**Absorption pipette, double**	Each	**£19·00**	*a*
GC-452	**Combustion pipette,** with filament assembly GC-460.	Each	**£11·50**	*a*
GC-454	**Combustion/absorption pipette,** with ground socket and filament assembly GC-460	Each	**£38·50**	*a*
GC-460	**Filament assembly,** with ground cone mounting, for GC-452 or GC-454 (also GC-412 and GC-414).	Each	**£4·40**	*a*
MA-660	**Magnifier.** For price see entry in List No. sequence.			

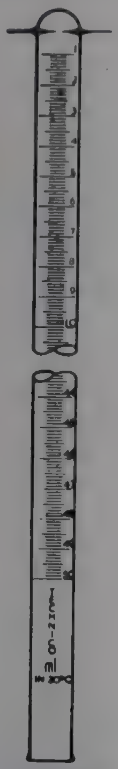
ACCESSORIES

LX-220	**Lubricant**	alternative lubricants for 5-way stopcock.	For prices see entries in List No. sequence.
VB-882	**Apiezon grease**		
MF-932	**Mercury,** triple distilled		
SY-410	**Syringe,** all glass, 20 ml, for introducing reagents into analyser		

All items on this page normally available from stock.


GD-020


GD-050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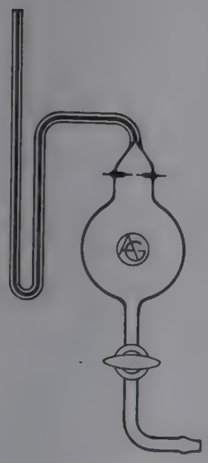
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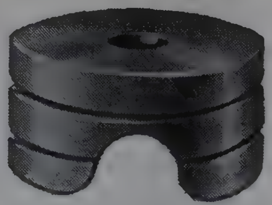
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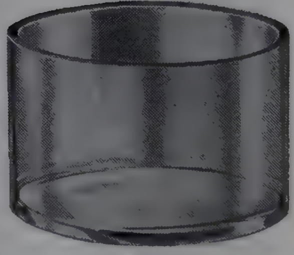
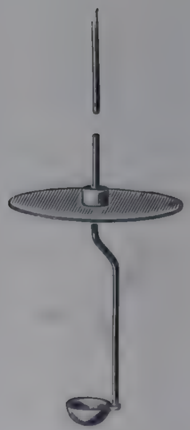

GD-245

GD-250


GD-300

GD-020

GAS BURETTE, Hempel, *Technico,* with straight bore stopcock at top and two-way stopcock at bottom. Capacity 100 cm^3 graduated in 0·2 cm^3, with levelling tube but **without rubber tubing** ... ... Pair **£5·25** *a*

GD-050

GAS BURETTE, Tutweiler, *Technico,* for the determination of H_2S in gas samples. Upper cylinder graduated 0–10 cm^3 in 0·1 cm^3 and with two marks on main bulb at 100 and 110 cm^3 ... ... Each **£3·90** *a*

GD-205

EUDIOMETER, Bunsen, capacity 50 cm^3 graduated in 0·1 cm^3. With sealed-in electrodes at the closed end. Each **£2·55** *a*

GD-210

GAS PIPETTE, Hempel explosion, (AG), borosilicate glass, with platinum electrodes, for use with levelling bulb ... ... Ten **£22·50** Each **£2·50** *a*

MF-920 **Mercury reservoir** suitable for use as levelling bulb with above. For price see entry in List No. sequence.

GD-240

BEEHIVE SHELVES, earthenware.

Diameter	7·5	10 cm	
Ten	**£2·40**	**3·40**	c
Each	**£0·30**	**0·40**	

GD-245

PNEUMATIC TROUGHS, glass, circular, for collection of gases over water or for storage of specimens.

Diameter	15	20	25	30	35 cm	
Height	10	10	12	12	15 cm	
Ten	**£8·20**	**10·20**	—	—	—	m
Each	**£0·90**	**1·14**	**1·77**	**2·23**	**3·57**	

GD-250

GAS JARS, glass, with ground flange.

Height	15	20	25	30 cm	
Int. dia.	5	5	5	7·5 cm	
Ten	**£3·80**	**4·00**	**4·50**	**8·20**	c
Each	**£0·44**	**0·45**	**0·50**	**0·92**	

GD-265

COVERS, glass, flat and ground on one side, for GD-250. In packs of 10.

Diameter of cover	7·5	10·5 cm	
Diameter of gas jar	5	7·5 cm	
10 packs	**£5·00**	**7·00**	c
Pack	**£0·56**	**0·78**	

GD-300

DEFLAGRATING SPOON, for burning sulphur, with brass shield ... ... Ten **£1·25** Each **£0·19** c

GD-320

SPLINTS, wood, for igniting and testing gases, in bundles of 1000 ... 10 bundles **£3·10** Bundle **£0·37** *m*

All items on this page normally available from stock.

GAS CYLINDERS AND ACCESSORIES

FILLED GAS CYLINDERS

GAS CYLINDERS, steel, colour coded to BS 349 according to gas content, 12·5 cm dia., **filled with gas (not suitable for inhaling).**

List No.	Contents	Each	
		£	
GD-401	28 lb carbon dioxide	**25·00**	*mN*
GD-402	40 ft³ air	**17·50**	*mN*
GD-403	40 ft³ nitrogen	**17·50**	*mN*
GD-404	40 ft³ hydrogen	**19·50**	*mN*
GD-405	48 ft³ oxygen	**19·00**	*mN*
GD-406	48 ft³ argon	**22·25**	*mN*
GD-407	44 ft³ helium	**28·75**	*mN*

Quotation on application for gases not listed above.

GD-420

COMBINATION TOOL, made of malleable iron, comprising a combined coupling wrench for flynut union nuts, spanner for cylinder gland nuts and key to fit cylinder valves ... ... Each **£0·70** *m*

PRESSURE REGULATORS

GD-510

PRESSURE REGULATOR for carbon dioxide only, with 55 mm diaphragm. This regulator connects direct to a carbon dioxide cylinder and has a cylinder contents gauge with dual scale reading to 150 kgf/cm² and 2300 lbf/in². The outlet pressure is adjustable from 0 to 8 kgf/cm² (0 to 120 lbf/in²) and is indicated by the position of the adjusting screw. With safety valve in low pressure side and outlet nozzle for 6·5 mm bore flexible tubing. Each **£9·00** *m*

GD-520

PRESSURE REGULATOR, single stage, for oxygen, air, nitrogen and argon, right hand thread. With cylinder contents gauge dual scaled 0 to 280 kgf/cm² and 0 to 4000 lbf/in². The outlet pressure is adjustable from 0 to 8 kgf/cm² (0 to 120 lbf/in²) and is indicated by the position of the adjusting screw. With outlet nozzle for 6·5 mm bore flexible tubing ... Each **£6·85** *m*

GD-530

PRESSURE REGULATOR, two stage, for oxygen, air, nitrogen and argon, right hand thread. With contents gauge dual scaled 0 to 280 kgf/cm² and 0 to 4000 lbf/in² and outlet pressure gauge dual scaled 0 to 2 kgf/cm² and 0 to 30 lbf/in². With outlet nozzle for 6·5 mm bore flexible tubing ... ... Each **£13·75** *m*

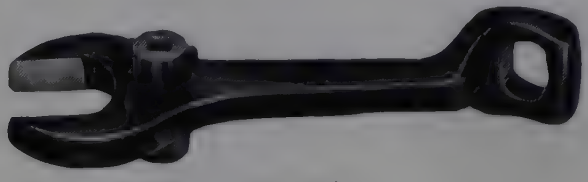
GD-531

PRESSURE REGULATOR for hydrogen, propane and coal gas, as GD-530 but with **left hand threads.** Each **£15·40** *m*

ACCESSORIES

GD-536 **Needle valve,** right hand thread, for fine adjustment of gas flow, to be inserted between regulator and outlet nozzle. For use with GD-510, GD-520 or GD-530. Each **£1·80** *m*

GD-538 **Needle valve,** as GD-536 but with left hand thread. For use with GD-531 ... ... Each **£1·90** *m*



GD-420

PRESSURE AND FLOW REGULATORS
IMPORTANT NOTES

1. Pressure regulators are designed to give reasonably steady outlet pressures over a range of flow rates; flow regulators are designed to give reasonably constant flow against fluctuations in back pressure.
2. It is not good practice to include needle valves downstream of components (e.g. flowmeters and low pressure gauges) not intended for high pressure operations unless a safety valve is fitted. Otherwise, with the needle valve screwed shut, leakage past the high pressure valve could slowly cause a sufficient build up of pressure to cause the low pressure component to explode.

GD-510 with GD-536
GD-520 with GD-536

GD-530
GD-531

Items on this page normally available from stock except those coded *N.*

OXYGEN
BRITISH OXYGEN

GD-557

FLEXIBLE TUBINGS

TX-625	**Rubber, thick wall, reinforced with canvas.**
TX-778	**PVC with terylene mesh reinforced wall.**

For details and prices see entries in List No. sequence.

GD-602

GD-620
GD-625

FLOW REGULATORS

GD-557

FLOW REGULATOR for oxygen (suitable also for air, nitrogen and argon), complete with flowmeter calibrated 2 to 15 litres/min of oxygen. Flowmeter readings must be corrected when using gases other than oxygen. A fine adjustment valve provides accurate smooth control of flow rates up to 35 litres/min. The regulator is fitted with a standard right-hand thread bull-nosed inlet to BS 341, cylinder contents gauge calibrated 0 to 4000lbf/in^2 and 0 to 280 kgf/cm^2, outlet pressure regulator preset at a nominal 4·2 kgf/cm^2, safety valve and a tapered nozzle suitable for flexible tubing up to 9 mm bore.
Each **£21·00** *m*

PROPANE REGULATOR

GD-531

REGULATOR with bull nose inlet and left-hand thread is suitable for use on propane cylinders. For price see entry in List No. sequence.

CYLINDERS, TROLLEYS AND STANDS

The following table shows the capacities and diameters of commonly used gas cylinders, together with suitable trolley size.

Dia. in	Capacity				Trolley size No.
	O_2	N_2O	CO_2	H_2, N_2 & Air	
5	—	—	14 lb	—	2
5½	48 ft^3	800 gal	28 lb	40 ft^3	2
7	120 ft^3	2000 gal	—	110 ft^3	3
8	180 ft^3	—	40 lb	165 ft^3	4
9	240 ft^3	—	—	—	5

CYLINDER TROLLEYS, for moving oxygen and other gas cylinders with a minimum of handling. Strongly constructed in heavy gauge steel tubing with welded joints, each trolley has cylinder retaining attachments and rubber tyred wheels.

GD-602

CYLINDER TROLLEYS, as specification, laboratory quality finish in stoved enamel with anti-static wheels.

Size No.	2	3	4	5	
For cylinders max. dia.	5¾	7	8	9 in	
Each	**£15·00**	**19·50**	**21·00**	**23·00**	c

GD-620

CYLINDER STAND, strongly constructed in steel, nylon coated to take cylinders up to 5¾ in dia.
Each **£6·25** *m*

GD-625

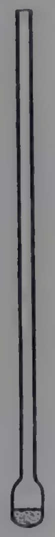
CYLINDER STAND, as GD-620 but to take cylinders up to 7 in dia. ... ... Each **£6·50** *m*

All items on this page normally available from stock.

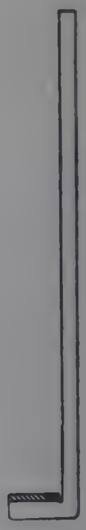
SINTAGLASS GAS DISTRIBUTION TUBES

- **Close tolerance porosity ranges**
- **Made from borosilicate glass**

For full details of porosity ranges and other useful information see data under page heading Sintered Glassware.



GD-800 to GD-802



GD-820 to GD-834

GAS DISTRIBUTION TUBES, *SintAGlass* with domed sintered glass bulb having an effective area equivalent to a flat plate of 20 mm diameter. Gives better absorption than a tube with a flat plate since gas bubbles are distributed in all directions. Can be inserted through a 19/26 socket. Stem length 300 mm.

GD-800	Porosity 0.	Ten	**£5·20**	Each	**£0·58**	*a*
GD-801	Porosity 1.	Ten	**£5·20**	Each	**£0·58**	*a*
GD-802	Porosity 2.	Ten	**£5·20**	Each	**£0·58**	*a*

ACCESSORIES

TJ-325	**Adapter**, with 19/26 cone, for fitting above tubes into apparatus with 19/26 sockets. See entry in List No. sequence.

Note: A short length of rubber or plastics tubing of 6 mm bore is required to effect a seal between the tube and the adapter.

Minimum gas pressure drop across plate (approx.) necessary to force gas through wet plates GD-800 to GD-834.

Porosity	Pressure, torr
0	8
1	15
2	25
3	55
4	180

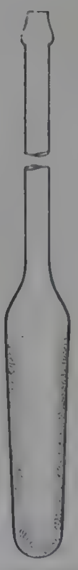
GAS DISTRIBUTION TUBES, *SintAGlass*, with flat sintered glass plate. Stem length 150 mm.

Plate diameter	15	20 mm	
Porosity	List Numbers		
0	**GD-820**	**GD-830**	
1	**GD-821**	**GD-831**	
2	**GD-822**	**GD-832**	
3	—	**GD-833**	
4	—	**GD-834**	
Ten	**£7·80**	**6·60**	*a*
Each	**£0·86**	**0·74**	

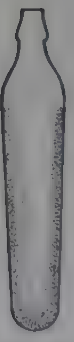
GAS DISTRIBUTION TUBES, *SintAGlass* **thimble form,** with sintered glass thimble, size 22 × 80 mm, providing a large surface area for rapid flow rates. Suitable also for use as immersion filters for removing large volumes of supernatant liquid from solid sediment. Available with short nipple connection or long suction tube. In two porosities:

Coarse	approx. equivalent to porosity 1.
Fine	approx. equivalent to porosity 3.

Stem length	300	30 mm	
Porosity	List Numbers		
Coarse	**GD-841**	**GD-851**	
Fine	**GD-843**	**GD-853**	
Ten	**£19·50**	**19·50**	*a*
Each	**£ 2·20**	**2·20**	



GD-841
GD-843

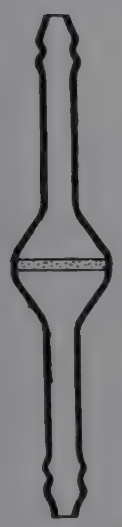


GD-851
GD-853

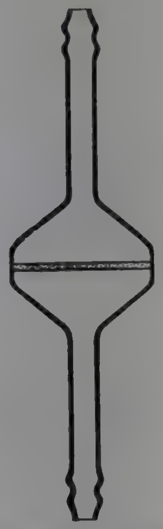
All items on this page normally available from stock.

SINTAGLASS GAS FILTER TUBES

For filtering solid particles out of gas streams



GD-951 to GD-954



GD-971 to GD-994

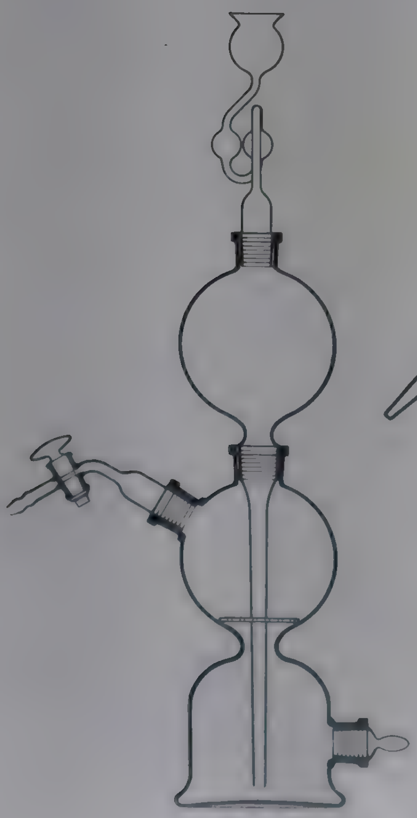
GAS FILTER TUBES, *SintAGlass* with **flat** sintered glass plate 30 mm diameter. Overall length 150 mm.

GD-951	Porosity 1.	Ten	**£8·00**	Each	**£0·90**	*a*
GD-952	Porosity 2.	Ten	**£8·00**	Each	**£0·90**	*a*
GD-953	Porosity 3.	Ten	**£8·00**	Each	**£0·90**	*a*
GD-954	Porosity 4.	Ten	**£8·00**	Each	**£0·90**	*a*

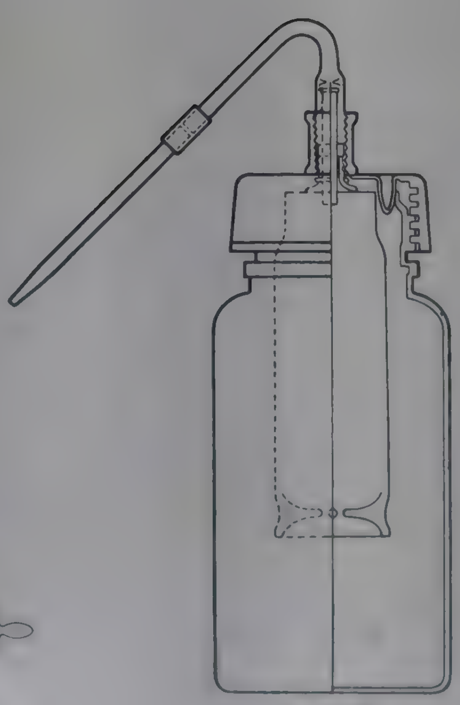
GAS FILTER TUBES, *SintAGlass.* with **flat** sintered glass plate.

Plate diameter	65	90	120 mm	
Overall length	230	260	350 mm	
Porosity		List Numbers		
1	**GD-971**	**GD-981**	**GD-991**	
2	**GD-972**	**GD-982**	**GD-992**	
3	**GD-973**	**GD-983**	**GD-993**	
4	**GD-974**	**GD-984**	**GD-994**	
Ten	**£18·50**	**34·00**	—	*a*
Each	**£ 2·05**	**3·80**	**5·70**	
Porosity				
5	**GD-975**	**GD-985**	—	
Ten	**£29·50**	—	—	*a*
Each	**£ 3·30**	**6·85**	—	

GAS GENERATORS



GE-055



GE-080

***GE-055**

GAS GENERATOR, Kipp, soda-lime glass, capacity 1000 ml. With stoppered tubulure at bottom, ground-in stopcock and safety funnel fitted with rubber stoppers. Without chemicals ... Ten **£86·00** Each **£9·60** c

REPLACEMENT PART

FP-660 **Funnel,** thistle. For details and price see entry in List No. sequence.

GE-080

GAS GENERATORS, *Quickfit,* for preparing common gases required in the laboratory. The borosilicate glass reaction chamber is mounted inside a polythene bottle and connected by a screw thread adapter through a valve to a glass delivery tube. Without chemicals.

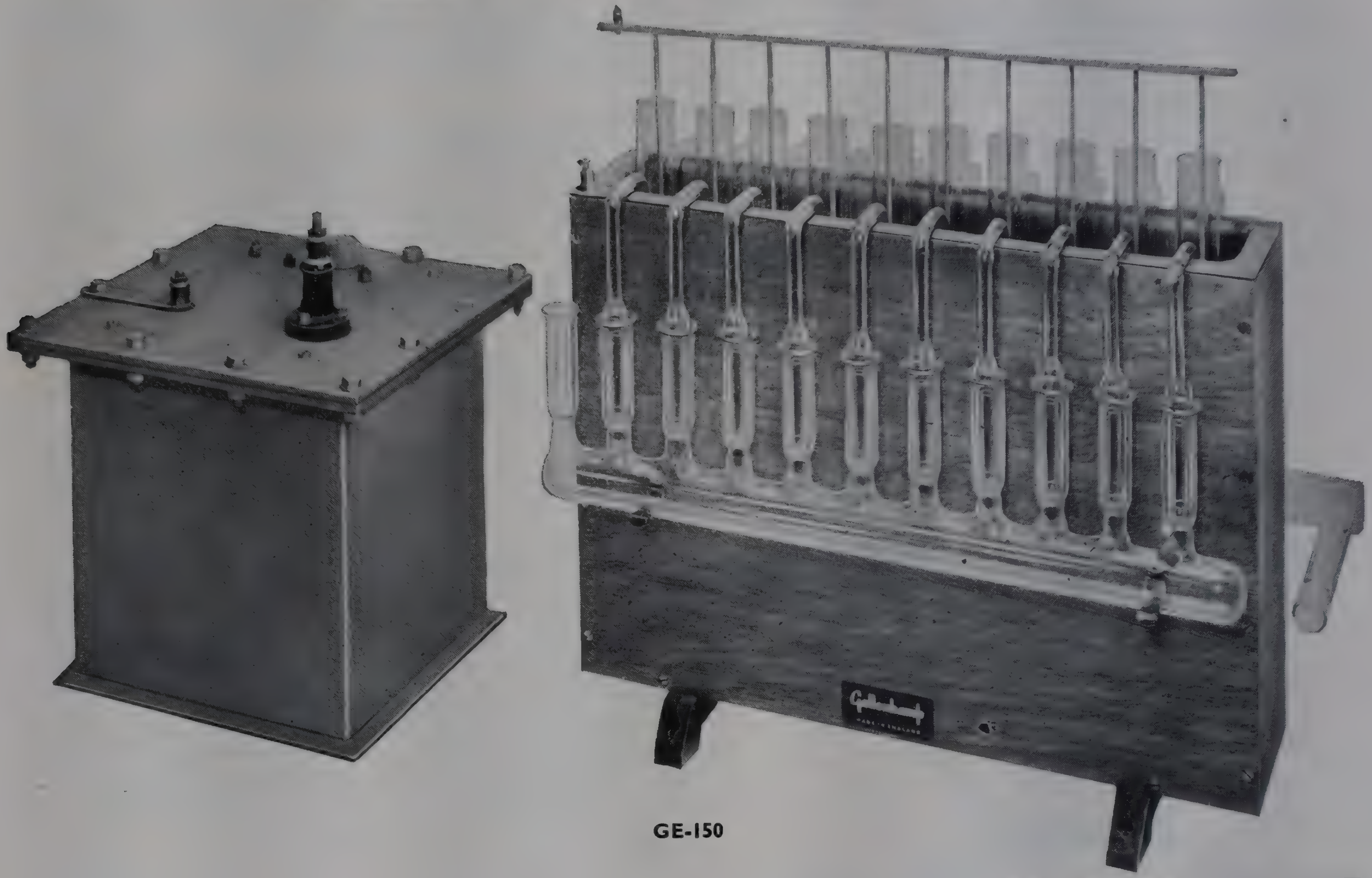
Ref. No.	2G	5G	10G	
Capacity	250	500	1000 ml	
Ten	**£24·00**	**25·50**	**29·50**	*m*
Each	**£ 2·60**	**2·85**	**3·30**	

BOTTOGAS LABORATORY GAS SUPPLY
PETROL-AIR GAS GENERATORS

For full details and prices see FV-930 to FV-958 in List No. sequence.

All items on this page normally available from stock.

Gallenkamp OZONE GENERATOR



GE-150

Ozone is a powerful oxidising agent with many laboratory applications including the oxidation of unsaturated organic materials and the preparation of organic peroxides. The ozone generator is a simple apparatus which can provide up to 150 ml/min of 6–7% ozonised oxygen.

PRINCIPAL AND OPERATION

Conversion of oxygen to ozone takes place when a high voltage is discharged through an oxygen atmosphere.

In this apparatus, the discharge is across the cylindrical space between the walls of a double walled soda-lime glass cell. The middle compartment of the cell is filled with a weak copper sulphate electrolyte solution in which is immersed a metal electrode. The outside of the cell also is surrounded by the same electrolyte contained in a lead lined wooden tank. The 7500V output from the transformer is connected between the metal electrode and the lead lining and causes a silent electrical discharge to take place across the cell.

A steady stream of oxygen passes through the cell and emerges enriched with ozone.

DESIGN

The apparatus comprises ten ozoniser cells connected in parallel by means of an inlet manifold with mercury sealed bridge tubes. The combined output of the cells is collected in an outlet manifold fitted with a 14/23 interchangeable ground socket joint and outlet tube with 14/23 ground cone for connection to the apparatus in which ozone is required. **A supply of oxygen regulated to about 0·35 kgf/cm² (5 lbf/in²) is required but not provided.**

Power rating, maximum	200 VA
Dimensions, transformer	29 × 30 × 20 cm
tank	38 × 18 × 47 cm
Weight, net	23 kg

WARNINGS

1 Ozone is not a dangerous substance to handle but some organic peroxides which can be prepared from it are liable to decompose with explosive violence.

2. Contrary to some belief ozone is toxic if inhaled for long periods.

GE-150

OZONE GENERATOR, *Gallenkamp*, as specification with ten ozoniser cells, lead lined wooden tank, inlet tube, inlet and outlet manifolds, outlet tube, electrodes, high voltage transformer and operating instructions. **Requires but does not include 1 kg mercury.** For 200/250V 50 Hz single phase supplies ... Each **£109·00** *b*

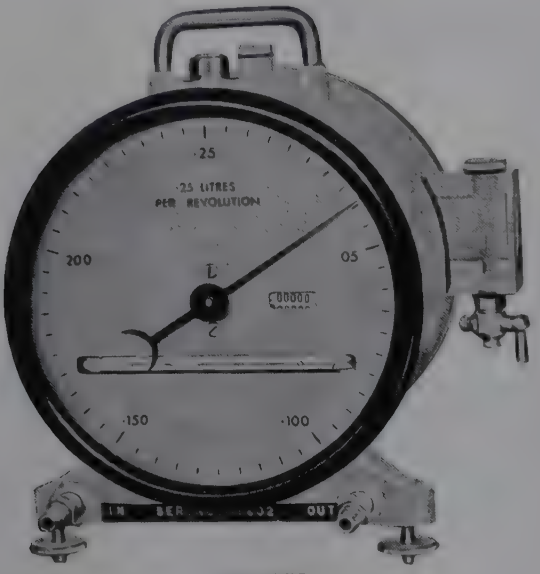
REPLACEMENT PARTS

GE-152	**Inlet tube** ...	Each	**£0·40**	*a*
GE-153	**Inlet manifold** ...	Each	**£7·30**	*a*
GE-154	**Ozoniser cell** ...	Each	**£1·90**	*a*
GE-155	**Outlet manifold,** with 14/23 socket ...	Each	**£7·30**	*a*
GE-156	**Outlet tube,** with 14/23 cone joint ...	Each	**£0·45**	*a*

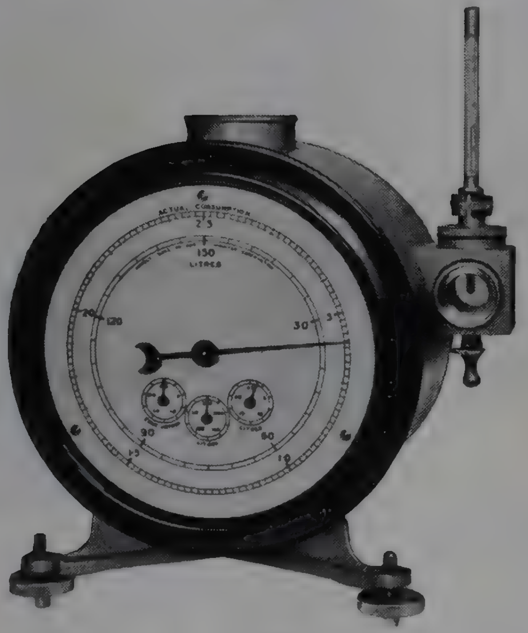
ACCESSORIES

GD-405	**Gas cylinder,** filled with oxygen.	For full details and prices see entries in List No. sequence.
GD-530	**Pressure regulator,** for oxygen.	
MF-932	**Mercury,** triple distilled ...	

All items on this page normally available from stock.



GF-052



GF-062

GF-095

GAS METERS - WET TYPE

For the measurement of total gas volume used and, by timed observation, the measurement of the rate of gas flow. Suitable for inlet pressure up to 10 in water gauge maximum.

GF-052

GAS METER, wet type, portable, operated on the Hyde principle with stainless steel drum in nylon bearings contained in an epoxy resin finished copper case. The meter is supported on three feet, two of which are adjustable. The connections are internally threaded for $\frac{1}{4}$ in BSP with detachable nozzles for rubber tubing. The meter is fitted with a 15 cm dial, indicating pointer, a 99,999 revolution counter, water line box, thermometer recessed into dial and spirit level.

Capacity/revolution	0·25 litres
Dial subdivision	0·005 litres
Maximum capacity/hour for	
accuracy ±0·25%	60 litres
,, ±0·5%	150 litres
Each	**£53·00** *f*

GF-062

GAS METER, wet type, of wide range and extremely versatile, operated by inlet pressure on a corrosion-resistant metal drum which has compartments formed by helical partitions. The drum is mounted on a stainless steel spindle and contained in a tinned copper case. The meter is supported on three feet, two of which are adjustable. The connections are threaded internally with detachable nozzles for rubber tubing. The meter is fitted with a 18 cm dial with indicating pointer, inner dial indicating hourly rate for 1 min observation, a 99,999 revolution counter, water line box, thermometer in protective casing and a spirit level.

Capacity/revolution	2·5 litres
Dial subdivision	0·02 litres
Hourly rate dial to	150 litres
Max. capacity/hour for	
accuracy ±0·25%	300 litres
,, ±0·5%	450 litres
Each	**£55·00** *f*

GAS METER - DRY TYPE

GF-095

GAS METER, dry type, with a central 15 cm dial with an outer scale indicating consumption and an inner scale showing the hourly rate of consumption by 1 min observation. For long period tests, a revolution counter reading up to 999 m³ is fitted. Must be used at rates of not less than 25 litres and at inlet pressures of not more than 10 in water gauge

Capacity/revolution	50 litres
Max. capacity/hour for	
accuracy ±0·5%	5000 litres
Each	**£38·13** *f*

GAS FLOWMETERS see FL-420 et seq. in List No. sequence.

All items on this page normally available from stock.

GAS SAMPLING

GF-400

GAS SAMPLING TUBE, (AG), **borosilicate glass,** to BS 2069 Type 1, with two stopcocks. Capacity 250 ml.
Ten **£18·50** Each **£2·05** *a*

GF-405

GAS SAMPLING TUBES, (AG), **borosilicate glass,** to BS 2069 Type 2, with two double oblique bore stopcocks.

Capacity	100	250 ml	
Ten	£28·00	32·00	*a*
Each	£ 3·10	3·60	

***GF-415**

GAS SAMPLING SYRINGE, 100 ml, with scale subdivided 1 ml. The precision ground barrel and plunger give a very low rate of gas leakage making the syringe eminently suitable for gas sampling, mixing and transfer. The tapered delivery nozzle is 40 mm long and fits 6 to 6·5 mm bore flexible tubing ... ... Each **£4·70** *m*

GF-430

GAS SAMPLING ASPIRATOR, comprising a rubber bellows with hard plastics end covers, leather strap handles and plastics nozzle and indicator. Capacity about 2·8 litres ... ... Each **£15·50** *m*

Rubber blowballs see RUBBER SUNDRIES.

GF-470

DUST AND MOISTURE ESTIMATION APPARATUS, (AG), comprising a glass vessel with ground sockets and stoppers in which a 30×77 mm absorption thimble may be fitted. The gas being sampled is passed through the apparatus, dust collecting in the thimble, and then through two drying tubes where water is absorbed. As some water is retained by the thimble, it is necessary to weigh before and after drying. **Without drying tubes** ... ... Each **£2·55** *a*

GF-473 Absorption thimbles, 30×77 mm, double thickness, suitable for above apparatus ... Box of 25 **£2·00** *m*

For suitable **drying tubes** see AB-655 and AB-665.

GAS WASHBOTTLES

GF-480

BOTTLES, Woulff, glass, with two ground socket necks.

Capacity	500	1000 ml	
Socket No.	14/23	19/26	
Each	£1·27	1·81	*m*

GF-482

BOTTLES, Woulff, glass, with three ground socket necks.

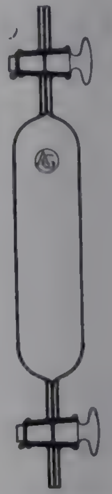
Capacity	500	1000 ml	
Socket No.	14/23	19/26	
Each	£1·50	2·10	*m*

ACCESSORIES

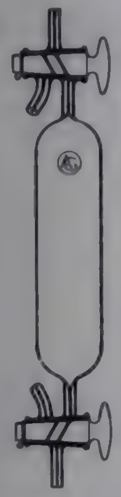
Joint size	14/23	19/26
Long entry tube Short exit tube Stopper	Q-MF 15/1B Q-MF 10/1B Q-SB 14	Q-MF 15/2B Q-MF 10/2B Q-SB 19
For prices see entries in *Quickfit* section.		

GF-500

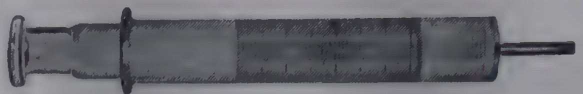
GAS WASHBOTTLE, (AG), to BLWA specification TCD 125. Capacity 40 ml, body length 10 cm, diameter 2·5 cm.
Ten **£4·60** Each **£0·51** *a*



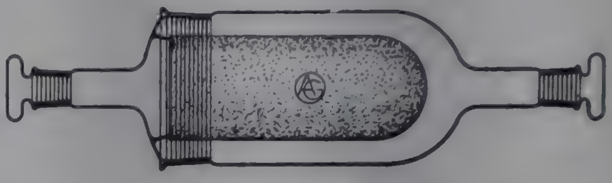
GF-400



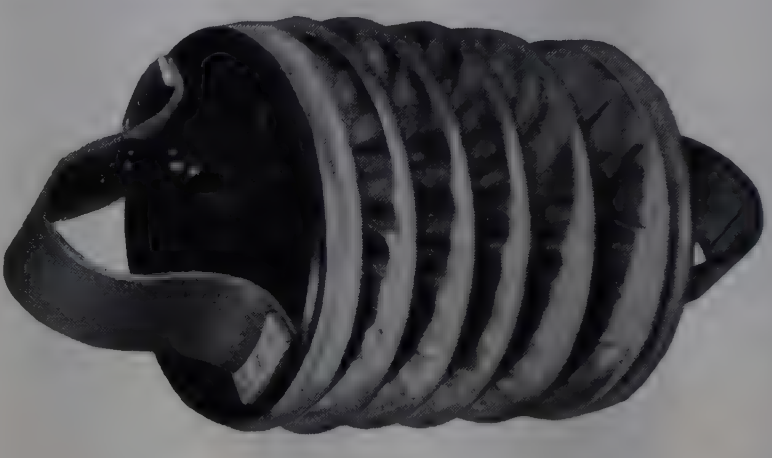
GF-405



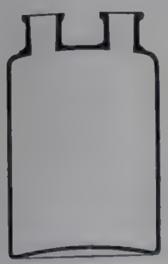
GF-415



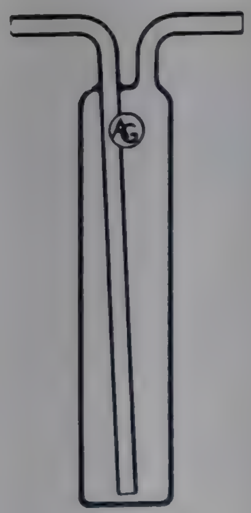
GF-470



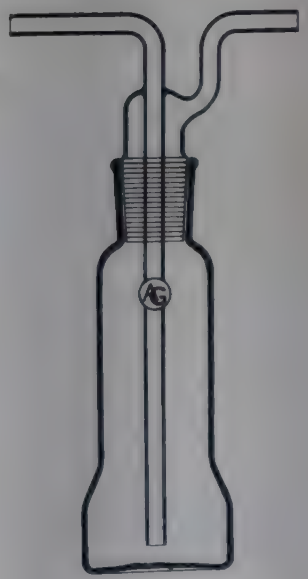
GF-430



GF-480



GF-500



GF-520

GF-520

GAS WASHBOTTLES, Drechsel, (AG), to BS 2461, with interchangeable ground-in head and 24/29 joints.

Capacity	125	250	500 ml	
Ten	£11·00	12·00	14·60	*e*
Each	£ 1·25	1·35	1·60	

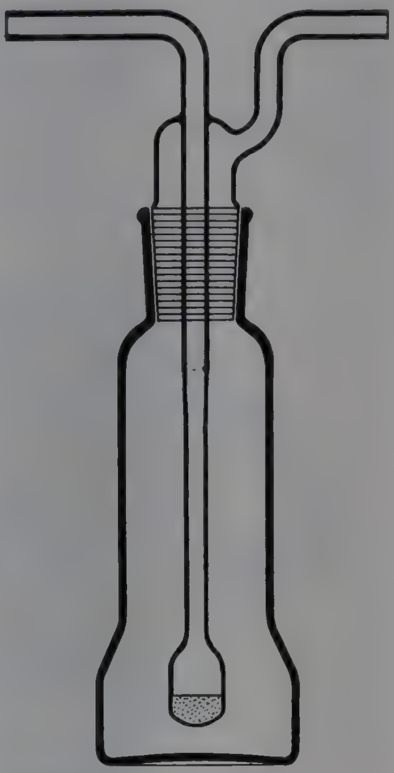
REPLACEMENT PARTS for GF-520

GF-522 Head, with 24/29 cone and distribution tube of length suitable for 500 ml bottle which the user can cut down when required on the smaller bottles.
Ten **£6·60** Each **£0·74** *e*

GF-658
GF-688
GF-718 } Bottles, see entry on next page.

All items on this page normally available from stock.

SINTAGLASS GAS WASHBOTTLES



GF-640 to GF-702

- **Close tolerance porosity ranges**
- **Colour code indication of porosity**
- **Non-friable sintered plates**
- **Made from borosilicate glass**

For full details of porosity ranges, colour coding and other useful information see data under page heading Sintered Glassware.

GAS WASHBOTTLES, *SintAGlass*, **Drechsel,** with **domed** sintered glass bulb on the distribution tube for efficient dispersion and washing. Comprises bottle and interchangeable head, joint size 24/29.

Capacity	125	250	500 ml	
Porosity		List Numbers		
0	**GF-640**	**GF-670**	**GF-700**	
1	**GF-641**	**GF-671**	**GF-701**	
2	**GF-642**	**GF-672**	**GF-702**	
Ten	**£16·50**	**17·50**	**20·50**	*a*
Each	**£ 1·85**	**1·95**	**2·30**	

REPLACEMENT PARTS

	Capacity	125	250	500 ml	
	Porosity		List Numbers		
Heads	0	**GF-650**	**GF-680**	**GF-710**	
	1	**GF-651**	**GF-681**	**GF-711**	
	2	**GF-652**	**GF-682**	**GF-712**	
	Ten	**£12·00**	**12·40**	**13·00**	*a*
	Each	**£ 1·35**	**1·40**	**1·45**	
Bottles		**GF-658**	**GF-688**	**GF-718**	
	Ten	**£4·50**	**4·90**	**7·20**	*a*
	Each	**£0·50**	**0·54**	**0·80**	

GAS WASHBOTTLES, *SintAGlass*, **Drechsel** with **flat** sintered glass plate on the distribution tube. Comprises bottle and interchangeable head.

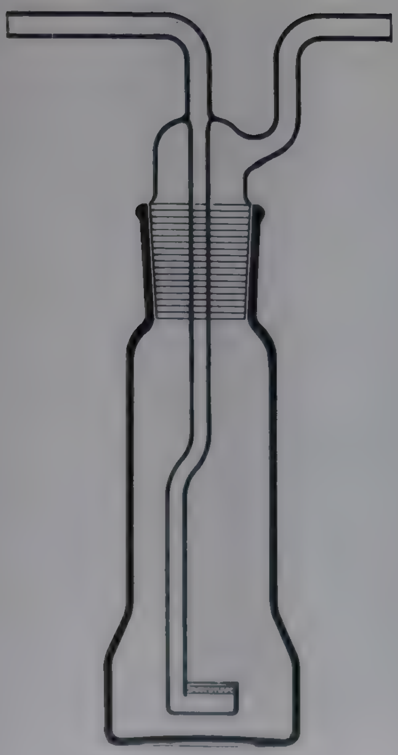
Capacity	125	250 ml	
Joint size	29/32	40/38	
Porosity	List Numbers		
0	**GF-740**	**GF-770**	
1	**GF-741**	**GF-771**	
2	**GF-742**	**GF-772**	
Ten	**£20·50**	**24·50**	*a*
Each	**£ 2·25**	**2·70**	

REPLACEMENT PARTS

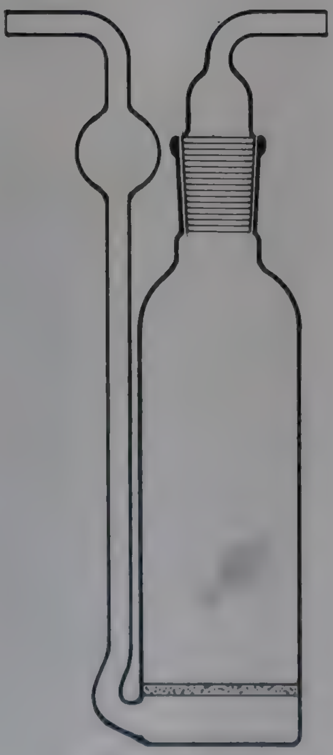
	Capacity	125	250 ml	
	Porosity	List Numbers		
Heads	0	**GF-750**	**GF-780**	
	1	**GF-751**	**GF-781**	
	2	**GF-752**	**GF-782**	
	Ten	**£14·00**	**18·00**	*a*
	Each	**£ 1·55**	**2·00**	
Bottles		**GF-758**	**GF-788**	
	Ten	**£6·40**	**7·00**	*a*
	Each	**£0·70**	**0·78**	

GAS WASHBOTTLES, *SintAGlass*, with **flat** large diameter sintered glass plate giving excellent absorption at very high flow rates. Comprises bottle with integral sintered plate and interchangeable head.

Capacity	100	500 ml	
Plate diameter	40	65 mm	
Joint size	19/26	29/32	
Porosity	List Numbers		
1	**GF-801**	**GF-821**	
Ten	**£21·50**	**33·00**	*a*
Each	**£ 2·40**	**3·70**	



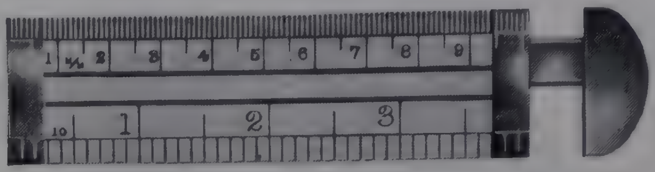
GF-740 to GF-772



GF-801
GF-821

All items on this page normally available from stock.

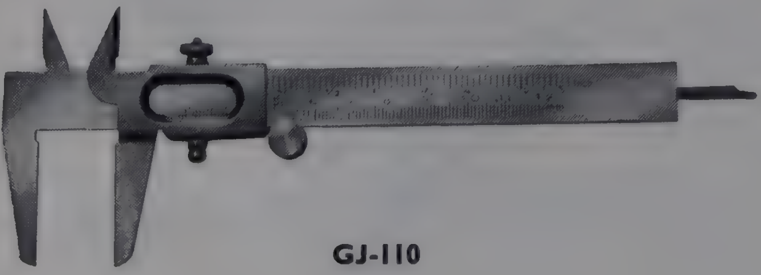
GAUGES FOR LINEAR MEASUREMENTS



GJ-100

GJ-100

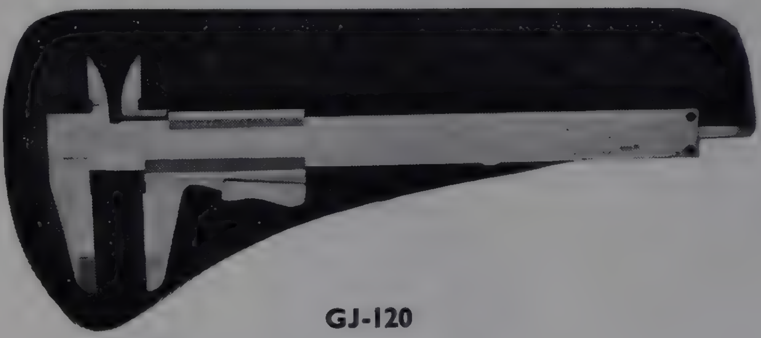
CALIPER, boxwood, with brass slide 4 in (10 cm) long, and two verniers reading to 0·1 mm and 0·01 in.
Each **£1·00** *m*



GJ-110

***GJ-110**

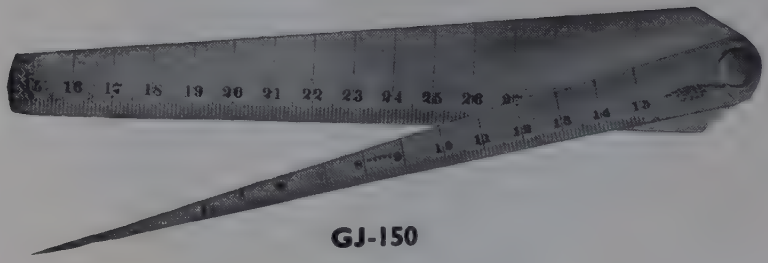
CALIPER, plated steel, with thumb roller and locking screw, for external, internal and depth measurements. Two scales 0—12 cm and 0—5 in, each with vernier reading to 0·1 mm and 1/128 in respectively. Maximum jaw opening 11 cm (4⅜ in) ... ... Each **£1·60** *m*



GJ-120

***GJ-120**

CALIPER, precision, hardened stainless steel, to BS 887, with thumb release lock, for external, internal and depth measurements. The jaws and cross horns are precision ground with chamfered and relieved ends for measuring small objects. Two scales 0—16 cm and 0—6 in, each with vernier reading to 0·1 mm and 0·001 in respectively. Maximum jaw opening 14 cm (5½ in).
Each **£11·00** *m*



GJ-150

GJ-150

TUBING GAUGE, tapered steel, in two sections, ranges 1 to 15 mm and 15 to 30 mm in 0·1 mm.
Each **£6·62** *m*

GJ-190

DIAL GAUGE, 6 cm dia. dial, with scale 0–100, reading in 0·01 mm. The dial and bezel rotate through 360° for zero setting. The stainless steel rack spindle has a range of movement of 12 mm ... ... Each **£5·00** *f*

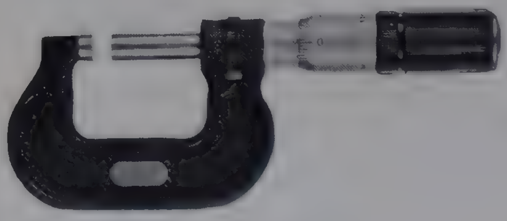
GJ-200

MICROMETER-SCREW GAUGE, steel, with scale, 0–25 mm, graduated to read in 0·01 mm. Fitted with ratchet and locknut ... ... Each **£4·40** *m*

GJ-205

MICROMETER-SCREW GAUGE, steel, with dual scales, 0–25 mm graduated to read in 0·01 mm, and 0–1 in graduated to read in 0·0004 in ... Each **£4·85** *m*

GJ-190



GJ-200

GJ-205

RULES

Boxwood
Maple
Steel
} see RX-021 et seq.

SCALES

Mirror scale see SB-220
Paper see SB-250

All items on this page normally available from stock.

Gallenkamp
20
40
60
80
100
lb/in²
kg/cm²
1
2
3
4
5
6
7

GJ-300

GAUGES FOR VACUUM AND PRESSURE MEASUREMENT

GJ-300

PRESSURE GAUGES, Bourdon tube, to BS 1780, with 5 cm dia. dial, scaled kgf/cm^2 and lbf/in^2. The shank is screwed ⅛ in BSP.

Scale	0–1 0–15	0–2 0–30	0–4 0–60	0–7 kgf/cm^2 0–100 lbf/in^2	
Ten	**£15·50**	**15·50**	**15·50**	**15·50**	*c*
Each	**£ 1·70**	**1·70**	**1·70**	**1·70**	

GJ-330

VACUUM GAUGE, Bourdon tube, to BS 1780, with 5 cm dia. dial, scaled 0–760 mm and 0–30 in Hg. below atmospheric pressure. The shank is screwed ⅛ in BSP ... ... Ten **£14·00** Each **£1·55** *c*

PRECISION VACUUM GAUGE, capsule dial type, see **VACUUM APPARATUS.**

GJ-350

STAND, for use with pressure gauges, GJ-300 and vacuum gauge GJ-330. Comprises a holder screwed ⅛ in BSP, with horizontal tubing connectors, 9 mm external dia., and a cast iron base, 7·5 cm dia. ... Each **£0·60** *b*

OTHER GAUGES will be found in this catalogue under the following headings.

Air pump gauges	See Air Pumps
Steam pressure gauges	See Autoclaves
Bomb calorimeter gauges	See Calorimeters
Filter pump gauge	See Filter Pumps
Gas cylinder gauges	See Gas Cylinders
Manometer gauges	See Manometers
Coating thickness gauges	See Paint Testing and Metallurgy
Pressure vessel gauges	See Filter Presses
Vacuum gauges	See Vacuum Apparatus

GJ-330 with GJ-350

GAUZES

GK-100

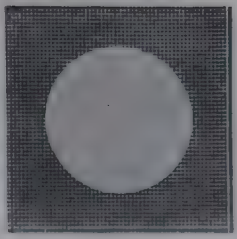
GAUZES, WIRE, iron, cut in squares.

Square	12·5	15 cm	
100	**£5·50**	**7·80**	*c*
10	**£0·60**	**0·86**	
Each	**£0·14**	**0·16**	

GK-105

GAUZES, WIRE, iron, cut in squares, with asbestos centres.

Square	12·5	15 cm	
100	**£9·60**	**12·00**	*c*
10	**£1·06**	**1·35**	
Each	**£0·18**	**0·20**	

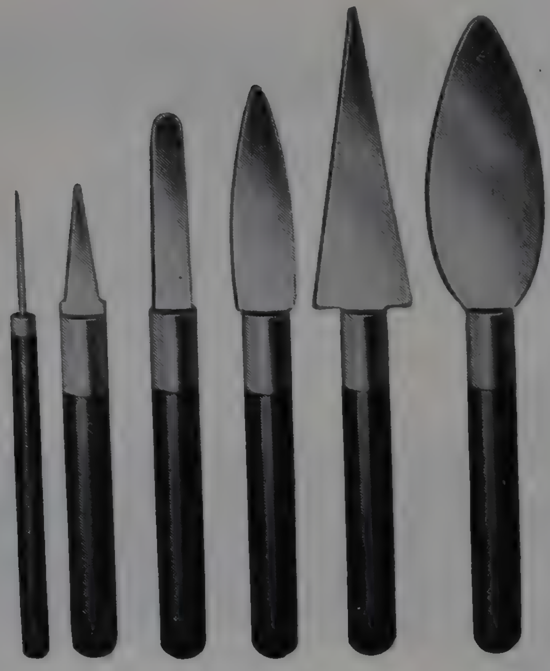


GK-105

GK-150

GAUZE, nylon, 100 cm wide, cut to any length. Mesh 40 holes/cm approx. ... Per 50 cm length **£2·00** *c*

All items on this page normally available from stock.



GP-100, GP-105

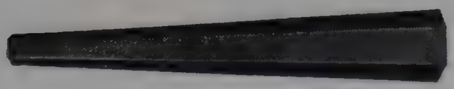
GP-100

GLASSBLOWING TOOLS, with brass blades except for No. 1, which has a nickel-chromium spike.

Pattern No.	1	2	3	4	5	6	
Ten	£3·80	5·80	5·20	5·70	5·80	6·40	*c*
Each	£0·43	0·64	0·58	0·64	0·64	0·72	

GP-105

GLASSBLOWING TOOLS, as GP-100, set of 6, one each Nos. 1 to 6 ... 10 sets £33·00 Set £3·60 *c*



GP-130

GP-130

GLASSBLOWING TAPERS, *Gallenkamp*, light metal alloy, hexagonal in section, 150 mm long, standard taper of 1 in 10, for opening out and flanging tubes.

Size	A	B	C	
Large end	15	25	35 mm	
Small end	1·3	10	20 mm	
Ten	£3·80	5·50	8·60	*b*
Each	£0·43	0·62	0·96	

GP-140

GP-140

GLASSBLOWING CONES, *Gallenkamp*, light metal alloy, for spinning and flanging tubes.

Dia. of cone	25	50 mm	
Ten	£4·00	6·00	*b*
Each	£0·45	0·66	

GP-175

GP-175

GLASS-CUTTING KNIFE, a knife with which sharpening time is eliminated by using expendable blades of hardened steel. An ideal economy knife for the laboratory worker as well as for the professional glassblower. Supplied with twelve spare blades.
Ten £5·40 Each £0·60 *b*

REPLACEMENT PART

GP-176 **Blades** ... 10 packs £2·00 Pack of 25 £0·26 *b*

GP-180

GP-180

GLASS-CUTTING KNIFE, *Gallenkamp*, for use with both borosilicate and soda-lime glass. The cutting edge is double ground tungsten carbide, 32 mm long, bonded to a diecast aluminium holder, 112 mm long. With silicon carbide sharpening stone, in leather case.
Ten £17·50 Each £1·95 *b*

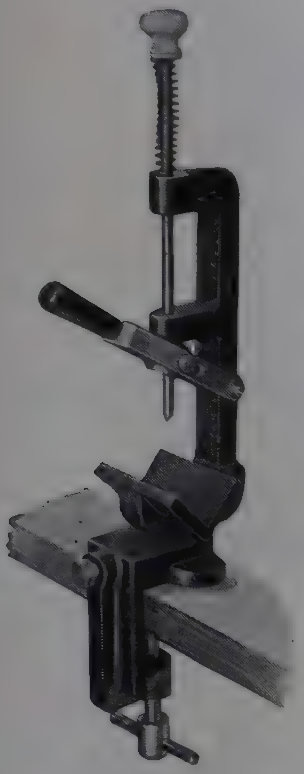
GP-182

GLASS-CUTTING KNIFE, *Gallenkamp*, as GP-180, but without sharpening stone or case.
Ten £11·00 Each £1·20 *b*

GP-184

SHARPENING STONE, silicon carbide.
Ten £2·00 Each £0·26 *c*

All items on this page normally available from stock.



GP-190

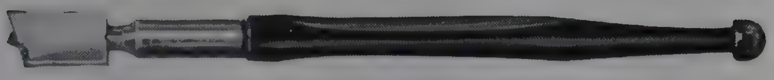
GP-190

GLASS-CUTTING TOOL, for bench mounting. The glass tube is rotated and a true ring cut by the diamond which is brought in contact with the tube by pressing down the lever handle. Suitable for tubing up to 32 mm dia.

Each **£12·00** c

REPLACEMENT PART

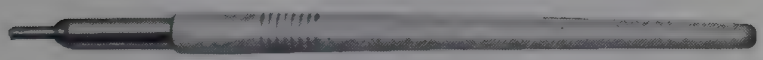
GP-195 Rod, with diamond tip. Each **£3·50** c



GP-210

GP-210

GLASS-CUTTING DIAMOND, mounted in metal, with wooden handle ... ... Each **£1·65** c



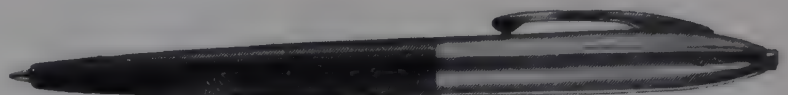
GP-225

GP-225

GLASS WRITING DIAMOND, mounted in metal, with wooden handle ... ... Each **£1·15** m

The following items in the catalogue will be useful for **glassblowing** purposes and full details will be found in List No. sequence.

ASBESTOLITE, see FW-680
BELLOWS, see BK-620
BLOWPIPES, see BR-150 to BR-180
ETCHING INK, see GR-200
FORCEPS, see DR-030, DR-032
GLASS TO METAL SEALS, see GR-250
GLASS ROD, see RT-020, RT-030
GLASS TUBING, see TX-250 to TX-290
GLOVES, asbestos, see CP-770, CP-775
GOGGLES, see CP-838
OXYGEN CYLINDERS AND REGULATORS, see GD-405 et seq.
PENCILS, glass marking, see PC-910
SPECTACLES, see CP-890 with CP-894
TUBING GAUGE, see GJ-150

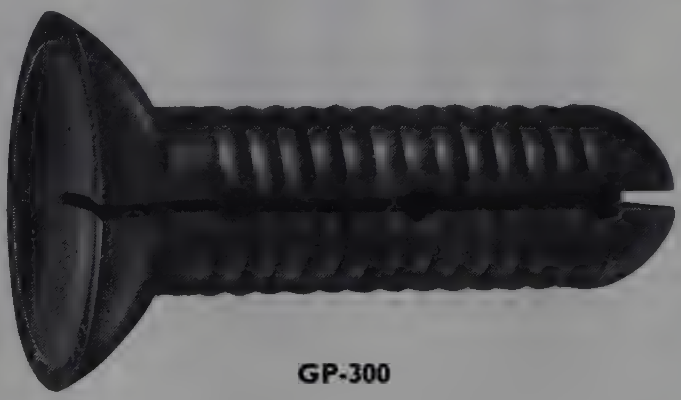


GP-230

GP-230

GLASS WRITING DIAMOND, pocket pattern with retractable diamond point and safety pocket clip.

Each **£1·35** m



GP-300

GP-300

SAFETY GRIP, for manipulating glass tubing, thermometers, etc. This is a safety device which should be in every laboratory. It is used for inserting glass tubing into rubber stoppers or corks, and protects the hands and wrists from splinters caused by breakage of the glass. It can also be used for breaking glass tubing after marking with a glass cutting knife ... ... Each **£0·80** m

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

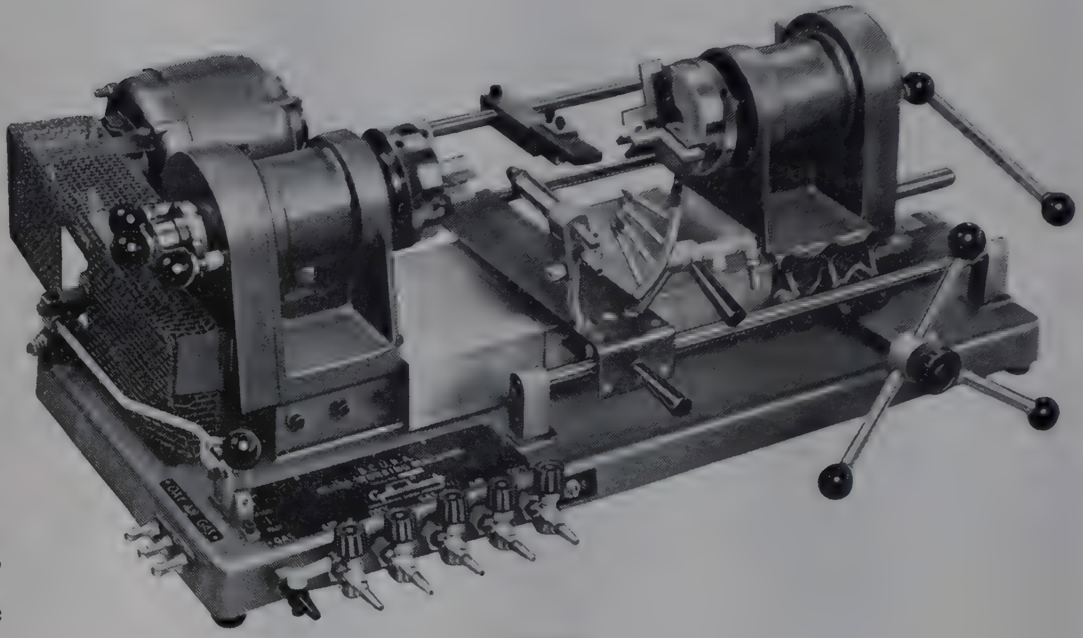
All items on this page normally available from stock.

B.C.U.R.A. GLASS WORKING LATHE

Developed in association with the British Coal Utilisation Research Association

- **Permits intricate work by semi-skilled operator**
- **Increases productivity for skilled glassblower**
- **Research and development 'specials' made in the laboratory**
- **Speeds repetition production in the factory**
- **Reduces production costs**
- **Works borosilicate or soda glass**
- **Range of tools for all types of operation**

Suitable for 'one off' or routine production of: Straight joins · Internal seals · Flanges · Necks and bulbs · Cone and socket joints · Graded seals · Glass to metal seals · Stopcock parts.



GP-402

SPECIFICATION

The lathe comprises a fixed headstock and a traversing tailstock, which can be locked in position, all mounted on a substantial cast base. A capstan handwheel operates the tailstock and also moves a sliding metal cover over the driving shaft to protect the working parts from dirt and broken glass. An integral $\frac{1}{4}$ hp electric motor, with a continuously variable speed drive, provides a speed range from 120 to 500 rev/min. The chucks are driven synchronously and are individually compensated for backlash. All driving shafts run in easily replaceable ball bearings. The burner mounting bridge runs freely on guide rails and the burners can be positioned smoothly between the chucks. A horizontal bar, fitted with a tool mounting clamp and an operating lever, is situated at the rear of the lathe. The tool mounting clamp can be locked in any position horizontally along the bar, and the vertical arc movement of the tool is governed by an adjustable limit stop on the operating lever. Nozzles for flexible tubing are provided for connecting to the air, gas and oxygen services. The supplies for the two burners are taken from two sets of control valves conveniently placed for the operator's left hand.

BURNERS

Two standard burners are available; both may be used with gas-air and gas-oxygen mixtures:

1. An efficient cannon burner complete with three interchangeable jets giving a wide range of flame sizes and intensities. When working borosilicate glass an air bleed must be introduced, by means of a T-tube, into the oxygen line to prevent damage by overheating of the burner jets.
2. A four-jet crossfire burner with interchangeable jets and integral oxygen injector.

Each burner is clamped on a ball joint to allow easy one-handed manipulation of the burner to any position.

A *Flamemaster* hand torch listed under BR-240 is a useful accessory for certain types of special work.

TOOLS

Two standard tools which can be shaped by the user are available:-

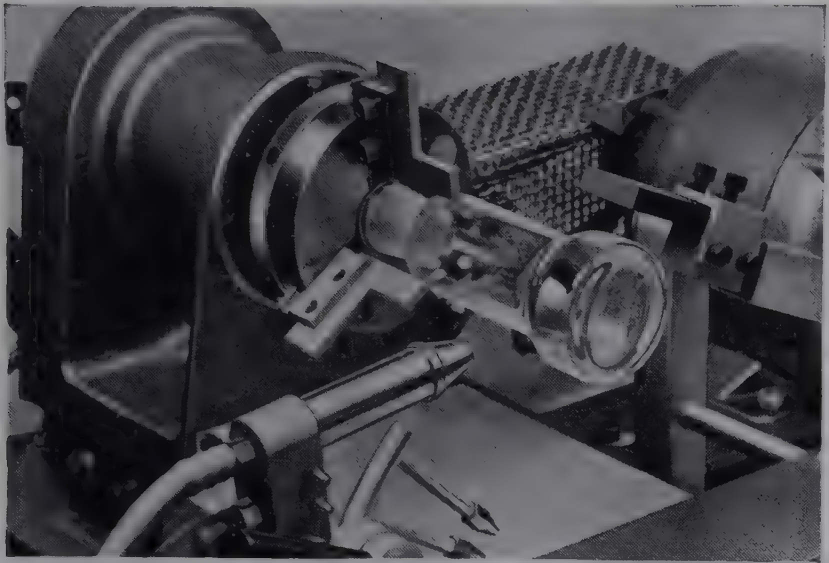
1. A flat rectangular carbon tip for use in the tool mounting clamp.
2. A cylindrical carbon tip for mounting in the tailstock chuck when this has been disconnected from the drive. The tailstock traverser is used to position the tool.

Bulb blowing to special shapes can often be done by using profile moulds, which can be made by the user either from flat carbon tips or sheet metal, and mounted in the tailstock chuck.

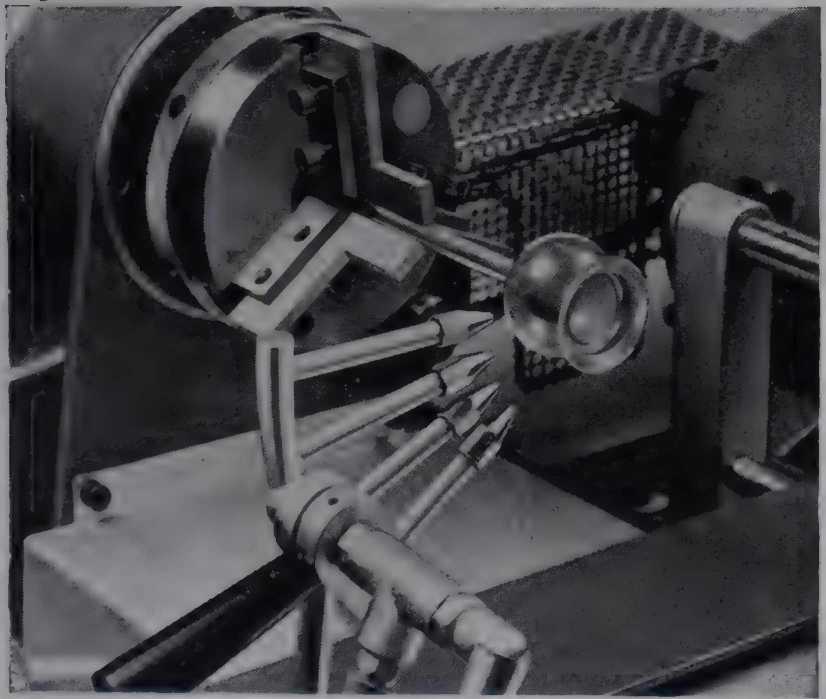
Samples of work made on machine

B.C.U.R.A. GLASS WORKING LATHE

(continued)



Cannon burner on Drechsel gas wash bottle



Crossfire burner on thistle funnel

GLASSBLOWING BLOWPIPES

For use with coal gas	see BR-150 and BR-155
For use with LPG (bottled) gases	see BR-160
For use with natural (methane) gas	see BR-180

For full details and prices see entries in List No. sequence.

SERVICES REQUIRED

Gas — town (coal) gas, LPG (bottled) gas or natural (methane) gas.
Air — at approximately 0·7 kgf/cm² (10 lbf/in²)
Oxygen — up to approximately 1·4 kgf/cm² (20 lbf/in²)
Electricity — 220/240V 50 Hz single phase supplies.

DIMENSIONS AND DATA

Chuck bore size	32 mm
Maximum distance between chuck faces	345 mm
Minimum distance beteeen chuck faces	130 mm
Chuck jaw opening, approximately	75 mm
Bed to chuck centre distance	110 mm
Overall length of lathe	915 mm
Overall width of lathe	710 mm
Chuck speed variable between	120 and 500 rev/min
Weight, approximately	54 kg

GP-402

GLASS WORKING LATHE B.C.U.R.A., a complete working outfit as specification, comprising lathe, cannon and crossfire burners, chucks, flat forming tool with six carbons, flanging tool with six carbons, hand tool handle blowing attachment and swivel. For air, oxygen and **town's (coal) gas supplies.** With drive motor for 220/240V 50 Hz single phase supplies ... Each **£618·00** *d*

GP-404

GLASS WORKING LATHE B.C.U.R.A., as GP-402 but for **LPG (propane/butane) supplies.** With drive motor for 220/240V 50 Hz single phase supplies. Each **£623·00** *dN*

GP-406

GLASS WORKING LATHE B.C.U.R.A., as GP-402 but for **natural (methane) gas supplies.** With drive motor for 220/240V 50 Hz single phase supplies. Each **£668·00** *d*

Machines for other electrical supplies, quotation on application.

ACCESSORIES AND REPLACEMENTS

GP-426	**Carbon tip,** rectangular... ...	Pack of 6	**£1·90**	c
GP-431	**Carbon tip,** cylindrical	Pack of 6	**£0·60**	c
GP-440	**Headstock 3-jaw chuck,** mounted complete on backplate with fixing screws	Each	**£56·00**	c
GP-445	**Tailstock 3-jaw chuck,** mounted complete on backplate with fixing screws	Each	**£56·00**	c
GP-450	**Blowing swivel,** for mounting in end of glass tube projecting through headstock mandrel.	Each	**£2·20**	c
GP-455	**Independent 4-jaw chuck,** for use on headstock, mounted complete on backplate with fixing screws.	Each	**£71·00**	c
GP-470	**Instruction manual,** additional copies.	Each	**£0·75**	c
AF-445	**Air pump,** to supply compressed air to burners.	For prices see entries in List No. sequence.		
BR-240	**Hand blowpipe,** *Flamemaster* and accessories.			
GP-100	**Glassblowing tools.**			
GP-130	**Glassblowing tapers.**			
GP-140	**Glassblowing cones.**			
GP-180	**Glass cutting knife.**			
TX-865	**T-tubes,** 36 × 7·5 to 8 mm for using cannon burner with oxygen-air mixtures.			
TX-525	**Tubing,** medium wall H6·5.			

Items on this page normally available from stock except those coded *N*.

***GR-100**

GLASS BALLS, solid, for use as packing in gas absorption or washing tubes. In pack containing approx. 250 ml.

Dia. approx.	3	4	6 mm	
Pack	**£1·00**	**1·00**	**1·00**	c

GR-140

GLASS TAPE, close woven, suitable for binding, insulation or tying. Reels of approx. 45 metres, 25 mm wide, 0·25 mm thick ... Ten **£11·40** Each **£1·25** c

GR-150

GLASS WOOL, specially prepared glass fibres for filtration purposes. In pack of 500 g.

10 packs **£5·70** Pack **£0·62** c

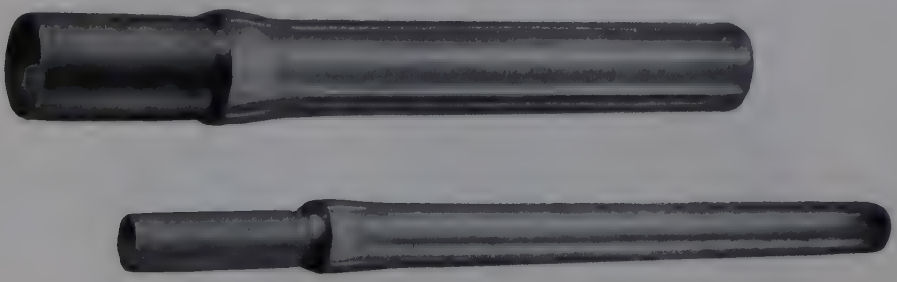
GR-160

QUARTZ WOOL, fused *Vitreosil*, consists of a mass of very fine quartz fibres of average dia. 6 μm, resembling cotton wool in appearance. It is used in the filtration of acid liquids and hot gases and as separating plugs for fillings in combustion tubes. In pack of 10 g.

Pack **£1·85** *m*

GR-200

GLASS ETCHING INK, for writing on soda-lime and flint glasses with an ordinary pen, in 1 oz (30 g) plastics bottle ... ... Bottle **£0·40** c



GR-250

GR-250

GLASS TO METAL SEALS, made from highest quality metal alloy tubing joined via a 4-stage graded seal to borosilicate glass. The metal portion may be joined to metal apparatus by soft soldering or, provided sudden heat is not applied, may be silver-soldered or brazed. The glass, with expansion coefficient $3{\cdot}2\times10^{-6}$, seals readily to all common borosilicate laboratory glassware. The seals are suitable for high vacuum work, and are supplied fully annealed and chemically cleaned.

Dia. external	6	13	19	25 mm	
Length metal + seal	12	12	18	25 mm	
Length glass	75	75	100	100 mm	
Each	**£1·30**	**1·35**	**1·60**	**1·70**	*m*

GLASS FIBRE FILTERS	see	FILTER PAPERS
GLASS TUBING	see	TUBING
GLASSWARE DRYERS	see	OVENS, also WASHING & DRYING EQUIPMENT

Gallenkamp GLOVE BOX

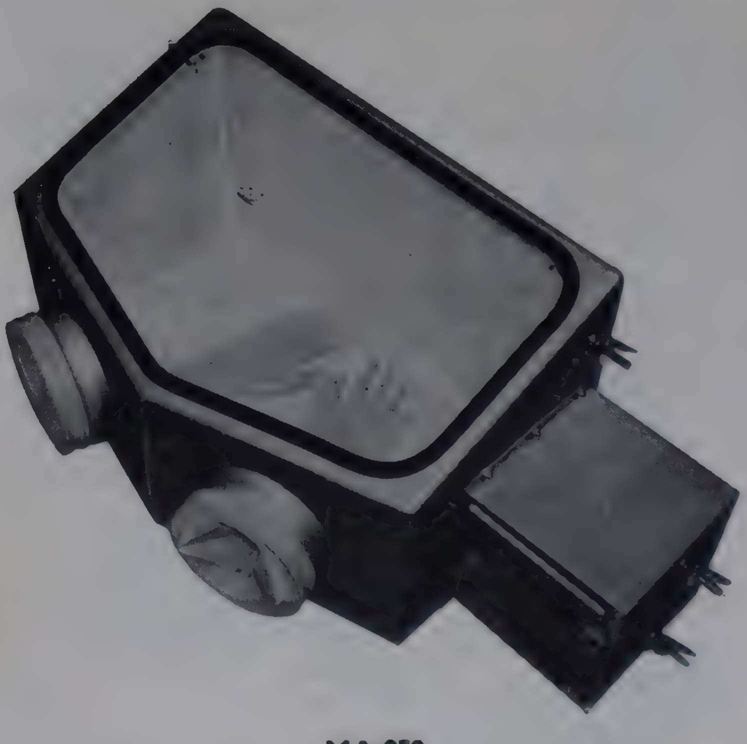
with automatic air-lock loading hatch

Suitable for handling:—

- **Low activity radioisotopes**
- **Toxic powders**
- **Hygroscopic substances**
- **Bacteriological materials**

- **Automatic air-lock loading hatch**
- **Large viewing window**
- **Choice of latex or neoprene gloves**

For details and price see MA-950 in List No. sequence.



MA-950

All items on this page normally available from stock.

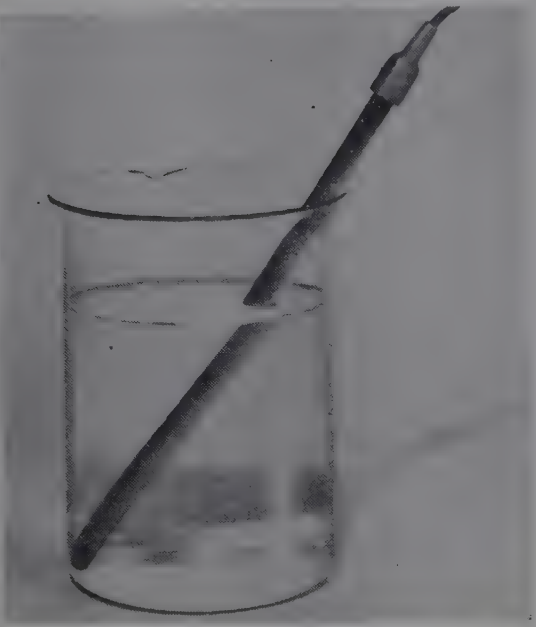
ELECTRIC IMMERSION HEATERS

***HD-100**

HEATERS, immersion, portable type, with heating element sheathed in plated copper tube. An extremely convenient low wattage heater fitted with a thermally and electrically insulated handle and a length of 3-core cable. For 220/240V supplies.

Length	7	7	9 in	
Loading	200	500	1000W	
Each	**£3·00**	**2·85**	**3·80**	*m*

HD-100



HD-113 to HD-115

HEATERS, immersion, *Electrothermal 'Red-Rod'*, comprising a heating element totally enclosed in a silica sheath, complete with 1·8 m of 2-core connecting cable. A radiant immersion heater which will go up to red heat, suitable for heating liquids in beakers, tanks, water-baths, etc. For 230/250V supplies.

List No.	Watts Loading	Overall length in	Heated length in	Each	
HD-113	300	10	5	£ **5·70**	*m*
HD-114	400	12	6	**6·10**	*m*
HD-115	500	14	8	**6·50**	*m*

HAEMACYTOMETERS see MEDICAL SCIENCES
HEAT TREATMENT see FURNACES

HD-152

HEATERS, immersion, with $\frac{5}{16}$ in diam. nickel plated copper sheathed hairpin element mounted under a flanged head threaded 1·55 in diam. × 26 t.p.i. Suitable for use in water and oil baths either vertically or mounted through a suitable hole in the side of the bath. Terminals are enclosed with gland entry for cable connection. Supplied complete with two joint rings and threaded locking ring. For 220/240V supplies.

Loading	250	500	1000W	
Length overall	37	45	53 cm	
Length of hairpin	30	37	45 cm	
Length of heated section	25	31	37 cm	
Each	**£4·00**	**4·00**	**4·00**	*m*

HD-152

HD-180

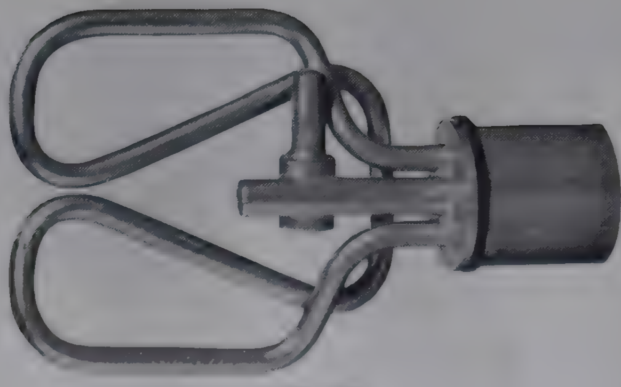
HEATERS, immersion, safety type, with tubular element in rectangular nickel plated copper sheath. Fitted with BS 3283 3-pin safety connector which is automatically ejected if the water level falls below the safe limit. Suitable for heating medium capacity waterbaths and requiring $1\frac{9}{16}$ in (39·7 mm) hole for mounting. Complete with sealing washers, threaded locking ring and connector. For 110/120, 200/210 or 220/240V supplies.

Loading	750	1000	1500	2000	W	
Immersion length from flange	110	132	132	132	mm	
Width	88	117	117	117	mm	
Each	**£2·17**	**2·17**	**2·17**	**2·17**		*m*

When ordering heaters please specify voltage.

REPLACEMENT PART

HD-182 **Set of sealing washers.** 10 sets £0·50 Set £0·13 c



HD-180

All items on this page normally available from stock.

Gallenkamp THERMO STIRRERS

For converting suitable containers into temperature controlled water and oil baths. Both models incorporate heaters, thermostats and efficient stirrers which can be converted into pumps for the external circulation of water at controlled temperatures.

- **Temperature range from ambient plus 5degC to 100°C**
- **Quiet and reliable operation**
- **Suitable for a wide range of bath sizes**

TM-840

THERMO STIRRER 1

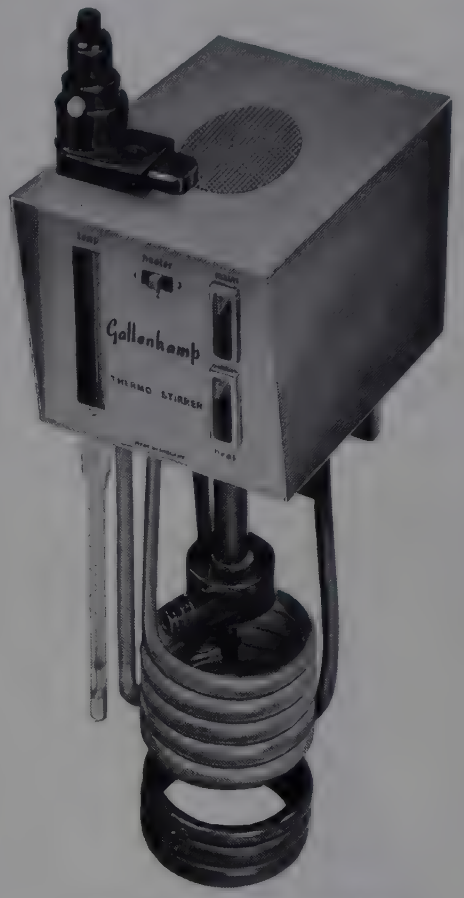
- Direct reading *Compenstat* temperature control.
- 1500W sheathed immersion heater.
- Temperature fluctuation 0·4degC or less.

TM-860

THERMO STIRRER 2

- Temperature controlled by contact thermometer and solid state relay.
- 1000W standard and 1500W accessory heaters.
- Temperature fluctuation 0·05degC or less.

Full details, prices and accessories see THERMOREGULATION.



TM-860 with accessories

RADIANT HEATER

HD-230

HEATER, RADIANT, *Vitreosil*, with element totally enclosed in fused silica and completely protected from acid vapours. This heater is designed to enable heating to be carried out from above, thus ensuring rapid evaporation without loss by spattering. It may also be inverted and used as a normal hotplate. Heating surface dia. 12·5 cm. Loading 400W. For 220/240V supplies. Without stand or bosshead ... ... Each **£19·25** *m*

Other voltages available to order.

HD-230 on suitable stand

INFRARED HEATER

For the rapid drying of small quantities of material, evaporation where splashing must be avoided, as in isotope work, or the application of local heat to an assembly such as a fractional distillation column. The sample temperature may be controlled by adjusting the distance from the lamp to the material.

The heater comprises a 275W infrared lamp, with built-in silvered reflector, mounted in an ES lampholder carried on a 20 cm long, 12·5 mm dia. tube which may be fixed into a standard bosshead. The 3-core connecting cable is taken through the centre of the tube.

HD-262

HEATER, infrared, as specification, without stand or bosshead.

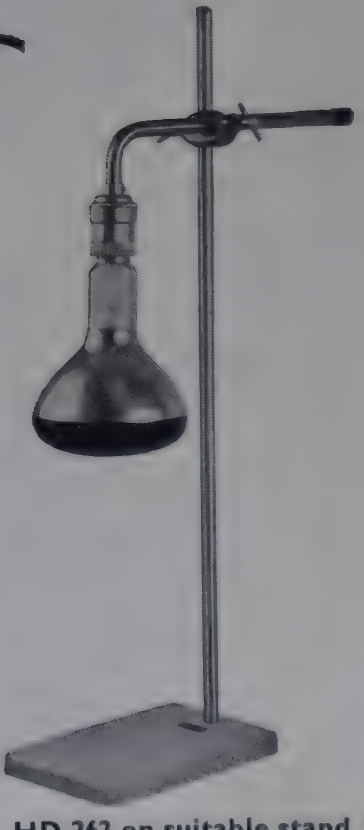
For 200/250V supplies	Each	**£3·50**	*m*
For 110/120V supplies	Each	**£4·10**	*m*

REPLACEMENT PART

HD-265 **Lamp bulb,** infrared, 275W.

For 200/250V supplies	Each	**£1·40**	*m*
For 110/120V supplies	Each	**£2·00**	*m*

When ordering please state voltage.



HD-262 on suitable stand

All items on this page normally available from stock.

HEATING MANTLES

CONSTRUCTION

Two types of heating mantle are offered:

Series M, MY, MR and MV where the mantles are mounted inside a metal container.

Series MG where the mantles have an elastic neck entry.

The construction of mantles for other purposes is on similar lines.

All mantles are sufficiently flexible to fit snugly round vessels of the same nominal size but with varying diameters. Heating elements are designed to operate at a low temperature, thus greatly reducing fire risk in the event of breakage.

The normal maximum working temperature is 450°C.

CONTROLS

Satisfactory temperature control may be obtained by using energy regulators, Variac transformers or rheostats, details of which appear under **ELECTRICAL CONTROLS.**

HD-500

HD-505

GENERAL PURPOSE MANTLES

HD-500

HEATING MANTLES, *Electrothermal,* **Series M,** for flasks, as specification, in metal container with wide rim. A thermocouple is incorporated in mantles of 1 litre or more, and the larger sizes, from 5 litres, with more than one circuit, have an indicator lamp for each circuit which can be controlled separately. All mantles are supplied with a plug and socket for connection to the mains. For 200/250V supplies.

For sizes and prices see table below.

HD-505

HEATING MANTLES, *Electrothermal,* **Series MY,** similar to the HD-500 series, but in economy frame without built-in thermocouple or indicator lamp. A bracket for mounting a support rod is fitted at the rear. Supplied with 3 ft of 3-core cable connected directly to the element for mains connection. For 200/250V supplies.

For sizes and prices see table below.

REPLACEMENT PARTS

HD-510 **Elements,** for mantles HD-500 and HD-505, see table below.

ACCESSORIES

HD-550	**Pyrometer,** bench stand type, with compensating leads, scale 0 to 500°C	Each **£17·80** *fN*
EC-810	*et seq.* **Control units** ...	For details and prices see entries in List No. sequence.
ED-600	*et seq.* **Variable transformers**	
ED-320	*et seq.* **Rheostats**	
SM-564	**Support rods,** duralumin, to fit support brackets on mantles HD-505	
SM-600	**Clamp,** *Technico*	
SM-610	**Bosshead,** *Technico*	

Flask capacity	Loading Watts	Mantles for 200/250V supplies		**HD-510** Replacement elements for HD-500 and HD-505 Each
		HD-500 Each	**HD-505** Each	
		£	£	£
50 ml	60	**7·50** *m*	**6·00** *m*	**3·80** *m*
100 ,,	60	**8·40** *m*	**6·60** *m*	**4·20** *m*
250 ,,	150	**9·00** *m*	**7·60** *m*	**4·90** *m*
500 ,,	200	**10·60** *m*	**8·60** *m*	**5·40** *m*
1 litre	300	**†12·50** *m*	**9·50** *m*	**6·30** *m*
2 ,,	500	**†14·80** *m*	**11·40** *m*	**7·40** *m*
3 ,,	500	**†18·30** *m*	**14·20** *m*	**9·20** *m*
5 ,,	800	**†23·80** *m*	**18·40** *m*	**11·90** *m*
10 ,,	1000	**†29·40** *mN*	**24·20** *mN*	**15·00** *mN*
20 ,,	1500	**†41·40** *mN*	—	**20·10** *mN*

† Fitted with thermocouple.

Larger sizes of mantles are available. Details on application.

Items on this page normally available from stock except those coded *N*.

SEMI-MICRO HEATING MANTLES

These mantles have been designed for heating semi-micro flasks, the flexible knitted heating element being suitable for pear shape or round bottom flasks from 10 to 50 ml. Average flask contents can be heated to 100°C in 4 to 8 mins. Two models are available, one having a built-in controller and support rod, both having a loading of approx. 60W on 200/250V a.c./d.c. supplies.

HD-570

SEMI-MICROMANTLE, *Electrothermal*, **Series MR,** in circular aluminium housing, for use with separate controller, complete with 3-core connecting cable. For 200/250V supplies ... ... Each **£6·30** *m*

HD-575

SEMI-MICROMANTLE, *Electrothermal*, **Series MR,** in circular aluminium housing with support rod, built-in controller, mains and heater indicator lamps. For 200/250V supplies ... ... Each **£11·50** *m*

NOTE: The hole in the support rod will accept clamps SM-670, SM-680, SM-682 or SM-685, etc.

Electrothermal
CAT. No.
ml.
SER. No.
WATTS
VOLTS
MAX. TEMP.
°C
MADE IN ENGLAND

HD-570

FLEXIBLE HEATING MANTLES

HD-604

HEATING MANTLES, earthed flexible, *Electrothermal*, **Series MG** with earthed casing and elastic neck entry.

Designed to meet the need for a light and flexible flask heater with element temperatures up to 450°C. The metal housing provides good earth protection, a stable base so that the mantle can either stand on the bench or be suspended on a flask and also acts as a safety reservoir in case of flask breakage.

The elastic nature of the knitted glass fabric enables flat or round bottom flasks and flasks of wide tolerance to be used with the same mantle. The intimate contact obtained provides efficient heat transfer and reduces heat losses to a minimum.

Connections to the elements are made by 3-core cable. For 200/250V supplies. For sizes and prices see table below.

Electrothermal

HD-575

Flask capacity	Loading Watts	Each	
		£	
50 ml	60	**6·20**	*m*
100 ,,	60	**6·90**	*m*
250 ,,	150	**7·40**	*m*
500 ,,	200	**8·00**	*m*
1 litre	300	**9·90**	*m*
2 ,,	500	**11·90**	*m*
3 ,,	500	**14·20**	*m*
5 ,,	800	**18·00**	*m*

HD-604

SPARE ELEMENTS cannot be supplied for the above mantles. The element is attached to the main glass fabric and repairs are not possible in the event of failure.

CONTROL ACCESSORIES

Control units see EC-810 et seq.
Variable transformers see ED-600 et seq.
Rheostats see ED-320 et seq.

All items on this page normally available from stock.

HD-654

MULTIMANTLES, *Electrothermal*, Series MV.

Multimantles are designed to accommodate a large variety of flasks and funnels of different sizes. They are intended for use in small laboratories with limited resources, but are not recommended for standard application, where a heating mantle of the correct size is to be preferred. The multimantle is designed on the same principles as HD-500, etc., but the shape of the knitted fabric allows such elasticity and flexibility that it shapes itself snugly to an infinite variety of vessels. An opening in the base enables funnels or vessels with a bottom drain-off to be heated as efficiently as round or flat bottomed flasks. A support rod may be fitted into the two-way socket either vertically or horizontally, ensuring a firm support for small vessels or the multimantle itself in any position. The mantle operates at temperatures up to 450°C with full or empty flasks. A switch is fitted on all models with two elements so that the upper circuit may be switched off when heating small vessels. For 200/250V supplies.

For sizes and prices see table below.

CONTROL ACCESSORIES for models without built-in regulator.

Control units see EC-810 *et seq.*
Variable transformers see ED-600 *et seq.*
Rheostats see ED-320 *et seq.*

Multimantles									Replacement elements		
List No.	Flask capacity	Mains supply	Support rods	Built-in controls		Loading Watts	Each		List No.	Each	
				Switch	Energy regulator		£			£	
HD-650	50 to 500 ml	a.c./d.c.	1	—	—	300	**10·60**	*mS*	**HD-670**	**5·00**	*mS*
HD-654	50 to 2000 ml	a.c. only	1	1	1	450	**18·30**	*mS*	**HD-672**	**7·40**	*mS*
HD-658	0·5 to 6 litres	a.c. only	3	1	1	800	**31·00**	*mS*	**HD-676**	**13·40**	*mS*
HD-662	2 to 12 litres	a.c. only	3	1	1	1000	**45·60**	*m*	**HD-680**	**17·90**	*m*
HD-666	5 to 22 litres	a.c. only	3	2	1	1500	**54·80**	*m*	**HD-684**	**22·70**	*m*

HEATING MANTLES, *Electrothermal*, Series MB, for squat form beakers, in metal containers, for 200/250V supplies.

List No.	Beaker capacity	Loading Watts	Each	
			£	
HD-752	100 ml	60	**10·80**	*m*
HD-754	250 ml	150	**11·70**	*m*
HD-758	600 ml	200	**13·00**	*m*
HD-760	1000 ml	300	**18·50**	*m*

HD-752 to HD-760 with beaker

HD-852 to HD-858 with funnel

HEATING MANTLES, *Electrothermal*, Series MD, for 60° funnels, with metal rim at top, elastic aperture for stem of funnel and support rod. For 200/250V supplies.

List No.	Funnel dia.	Loading Watts	Each	
			£	
HD-852	50 mm	60	**9·80**	*m*
HD-854	75 mm	60	**10·80**	*m*
HD-856	100 mm	200	**12·70**	*m*
HD-858	125 mm	300	**15·20**	*m*

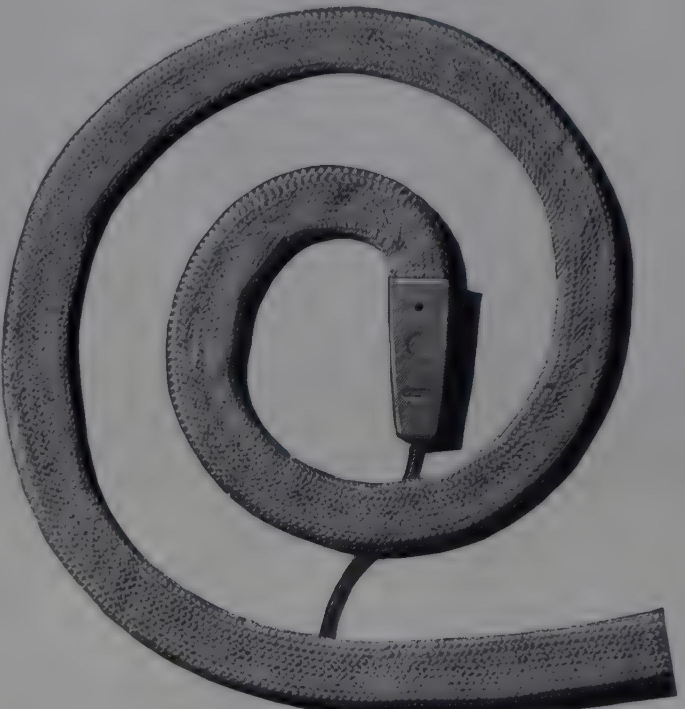
Items on this page coded S normally available from stock.

HEATING TAPES AND CORDS

Electrothermal flexible heating tapes provide a source of supplementary heat on fractionating columns and distillation processes to prevent solidification or condensation of high boiling point substances. They are ideal for applying heat to pipes, tubes and vessels of non-standard shapes and sizes when it is not practical to use normal heating mantles or heating jackets.

HEATING TAPE (Heat-by-the-yard), *Electrothermal*, Series HT.

This flexible and elastic tape is invaluable for the simple and efficient heating of complicated shapes, since it can be cut to the required length and insulated terminals fitted. It comprises a continuous network of resistance wires enclosed in a knitted elastic sleeve of glass fibre yarn. The electrical resistance is such that the normal working voltage is approximately 10V per ft length which gives a power rating of 7W/in² (1W/cm²). Temperatures up to 450°C can be achieved.
Supplied with voltage/temperature Nomogram in a dispensing carton.



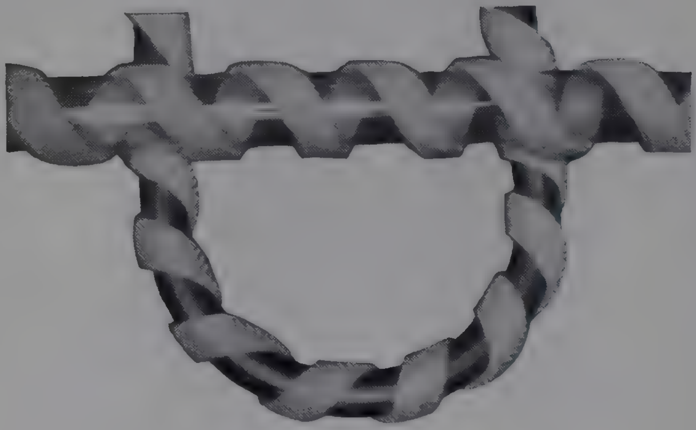
HE-100 to HE-115

List No.	Length (approx.) ft	Length (approx.) cm	Width (approx.) in	Width (approx.) mm	No. of connectors	Each £	
HE-100	25	765	0·5	12·7	6	**18·90**	*m*
HE-105	50	1530	0·5	12·7	12	**35·00**	*m*
HE-110	25	765	1	25	6	**23·80**	*m*
HE-115	50	1530	1	25	12	**43·20**	*m*

It is essential that these tapes be used with a voltage controller.

CONTROL ACCESSORIES for heating tapes

Control units see EC-810 *et seq.*
Variable transformers see ED-600 *et seq.*



HE-150 to HE-154

HE-130
CONNECTORS, for HE-100 to HE-115.
Box of 12 **£4·30** *f*

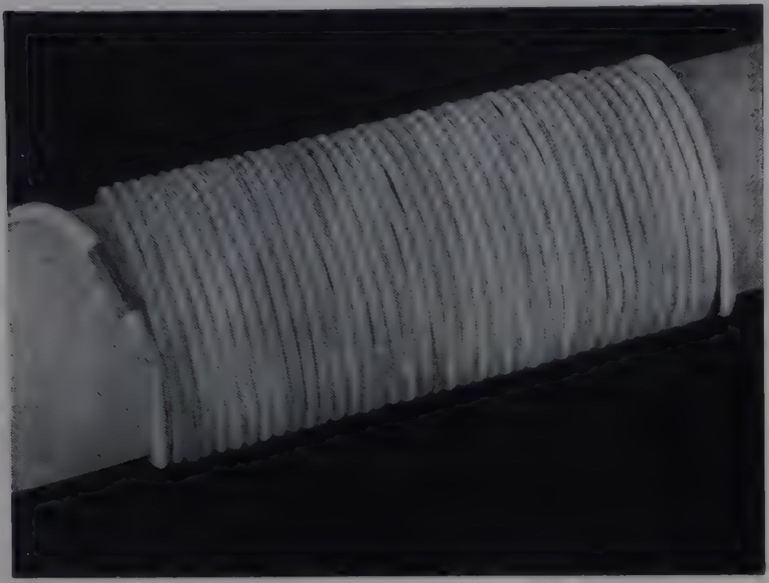
HEATING TAPES, *Electrothermal*, Series HT3.

Made of one or more fabric bands of resistance wire separated and bordered by bands of high temperature resisting glass fibre yarn. The surface loading of the heating tapes is approx. 3W/in² (0·5W/cm²) of tape, and will give temperatures of 400°C and over inside a glass tube of 2 mm wall thickness. The tapes are insulated both sides and fitted with lead-in wires terminating in a mains supply connection. Glass laces are provided at both ends to hold the tape in position. For 200/250V supplies.

List No.	Length (approx.) in	Length (approx.) cm	Width (approx.) in	Width (approx.) mm	Watts	Each £	
HE-150	48	125	0·5	12·7	72	**4·40**	*m*
HE-152	36	90	1	25	100	**4·80**	*m*
HE-154	72	180	1	25	210	**6·90**	*m*

These tapes are available in a wide range of sizes from 24 to 96 in long and from 0·5 to 3·5 in wide. Full details on application.

All items on this page normally available from stock.



HE-250 to HE-275

HEATING CORD, *Electrothermal.*

For applications necessitating heat inputs where heating tapes cannot meet the requirements. Comprises a heating element enclosed in a tough fibre glass braided sheath approx. 5 mm dia., available in several lengths with 60 cm inactive end connections. Designed to operate at up to 5W per linear inch; close wound, the loading is 26W/in² (4W/cm²). Can be used to produce very localised heating for vapour tubes for example, or irregular shapes irrespective of size or material. **It is essential to use a control unit with these heaters.** Temperatures up to 450°C can be achieved. For 200/250V supplies.

List No.	Length		Loading W at 230V	Each	
	ft	cm		£	
HE-250	1	30·5	60	**2·60**	*m*
HE-255	2	61·0	120	**3·10**	*m*
HE-260	4	122·0	240	**4·50**	*m*
HE-265	8	244·0	480	**7·20**	*m*
HE-270	16	488·0	960	**11·10**	*m*
HE-275	32	976·0	1920	**16·90**	*m*

CONTROL ACCESSORIES

Control units see EC-810 *et seq.*
Variable transformers see ED-600 *et seq.*

HE-400

HEATER, BUNSEN, *Electrothermal.*

This heating apparatus combines the advantages of a gas burner with cleanliness in operation and ease of control associated with electrical heating. The radiation of the heater is directed upwards only, and it can be used for heating test tubes, crucibles, small beakers or flasks. Used inverted, it can provide the source of heat for evaporations. The apparatus is made of corrosion resistant metal, and consists of a heating element embedded in refractory material mounted in the top of a vertical tube which forms the supporting case. This tube is provided with air circulating holes in the lower part and a gap between the element and the casing prevents any undue temperature rise. The heater stands on rubber feet and can be held in the hand. A removable cowl fitted to the top deflects heat radiation from the hand. The overall height is 18 cm and the element, rated at 400W, gives a temperature range from 800° to 1000°C.

HE-400

HEATER, BUNSEN, *Electrothermal*, as specification, for a.c. or d.c. supplies.

For 230/250V	Each	**£10·80**	*m*
For 200/220V	Each	**£10·80**	*mN*
For 100/120V	Each	**£10·80**	*mN*

REPLACEMENT PART

HE-410	**Heating element**	Each	**£4 20**	*m*

CONTROL ACCESSORIES

Control units see EC-810 *et seq.*
Variable transformers see ED-600 *et seq.*

Gallenkamp

ELECTRONIC RELAY

A mains powered transistorised relay which enables a contact thermometer to control heater switching.

Power contacts—rated at 20A on 250V a.c. non-inductive supplies and 1A on 220V d.c. supplies.

For full details and price see EC-780 in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp
ovens
incubators

HEATING APPARATUS
see
•FURNACES • HOTPLATES
•INCUBATORS • OVENS

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Catalogue headings under which apparatus of histological interest is also included: Dissecting; Jars; Microscopes; Microtomes; Plates; Refrigeration (Freezer aerosol); Tubes.

Gallenkamp WAX EMBEDDING BATH

Suitable for most routine specimen preparations.

- **Maximum temperature 100°C**
- **Thermostatic control to ±0·2degC**
- **Supplied with:**
  - **wax storage vessel approx. 1200 ml capacity**
  - **6 specimen pots each approx. 200 ml capacity**
  - **4 specimen tubes each approx. 30 ml capacity**

HJ-040

CONSTRUCTION

The stainless steel bath is mounted in a rust-proofed steel outer case and the interspace is packed with efficient thermal insulation. The stainless steel cover is recessed into the bath so that any spilt wax is prevented from running over the bench. Six plated spun copper pots approximately 6·3 cm dia. × 6·3 cm deep are supported by the cover. A larger pot approximately 12 cm dia. × 11 cm deep fits into the cover and may be used for storing paraffin wax. Four glass tubes of 2·5 cm dia. × 5 cm deep are provided for use with small size specimens. Overall dimensions 50 × 35 × 20 cm. The bath is uniformly heated by a 500W sheathed immersion element controlled by a *Compenstat* thermostat to within ±0·2degC. The *Compenstat* which is fitted with a direct setting scale 0 to 100°C is mounted in a separate compartment at one end of the bath together with a mains switch and indicator lamp.

HJ-040

BATH, WAX EMBEDDING, *Gallenkamp*, as specification. Comprising water bath and stainless steel cover complete with one large and six small pots and four glass tubes. For a.c. single phase supplies.

For 220/240V ...	Each **£113·50**	*b*
For 200/210V ...	Each **£113·50**	*bN*
For 110/120V ...	Each **£113·50**	*bN*

When ordering please state voltage and frequency of supply

REPLACEMENT PART
TW-600 **Tubes,** 50 × 25 mm. For price see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp WAX EMBEDDING OVEN, 100°C

- **Efficient impregnation**
- **Large embedding pots**
- **Large storage space**
- **Thermostatically controlled**

This specially designed oven, comprising an anhydric wax embedding bath and a large capacity storage space, is particularly suitable for routine large scale impregnations.

EMBEDDING BATH

The embedding bath taking twelve embedding pots, is above the storage space and is protected from dust, etc., by a lift-up cover which opens backwards and is fitted with retaining stays and lifting handle. The pots are plated copper spinnings of large dimensions, 7·5×4·4 cm deep, with handles and loose covers. The size of the pots permits large specimens to be treated and ensures efficient impregnation at all times. A draining tray extends completely beneath the pots to catch any accidentally spilt wax which may be removed periodically via a drain-cock at the lowest point of the tray. The shelf supporting the pots has turned-up edges ensuring that all spilt wax will fall onto the tray. This prevents the embedding section from flooding with wax and also maintains a clean external oven surface.

STORAGE OVEN

The lower part of the oven is fitted with a door and a perforated shelf for drying slides.

The large storage space, 33×46×43 cm high, can also be used to store the paraffin wax. Thus a convenient supply of melted wax may be maintained in close proximity to the embedding pots. The oven may also be used for embedding large specimens.

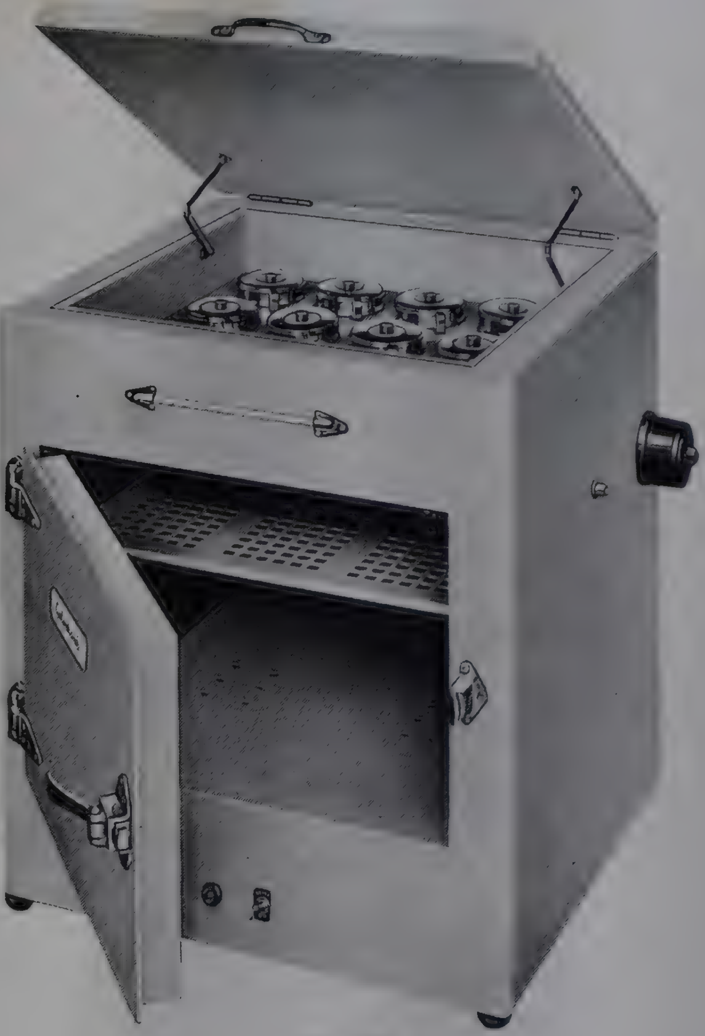
HEATING

Heating is by means of elements fixed on the bottom and two sides of the oven liner. Total loading is 500W. The temperature is controlled to within ±1degC by the bimetal thermostat fitted through the side of the oven. A pilot lamp fitted below the oven door indicates the operation of the thermostat and a 'mains-on' pilot lamp is also provided. The bath temperature is indicated by a built-in angle thermometer in the embedding section. A thermometer may be inserted through a tubulure in the storage section.

CONSTRUCTION

The oven is constructed of welded steel and finished in grey duotone stoved enamel. The aluminium sheet liner is lagged with glass fibre and fitted with a shelf. Both door and cover are fully lagged and the oven door is hung on heavy duty hinges and fitted with a roller bolt catch.

	H	W	D
Overall dimensions	66 ×	57 ×	53 cm



HJ-100

HJ-100

OVEN, WAX EMBEDDING, *Gallenkamp*, electrically heated, as specification. With twelve embedding pots and fitted angle thermometer. For a.c. single phase supplies.

For 220/240V	Each	**£310·00**	*b*
For 200/210V	Each	**£310·00**	*bN*
For 110/120V	Each	**£310·00**	*bN*

When ordering please state voltage.

REPLACEMENT PARTS

HJ-105	**Pots, embedding,** plated copper, with covers.	Each	**£2·60**	*b*
HJ-108	**Thermometer,** angle, solid stem, scale span 0–110°C in 1degC	Each	**£1·15**	*c*

ACCESSORY

TJ-320 **Thermometer,** scale span—5 to 105°C in 1degC, for fitting in thermometer tubulure. For price see entry in List No. sequence.

Suitable **stainless steel jug** for paraffin wax see JV-150. Suitable **stainless steel funnel** for use with paraffin wax see FP-370.

Items on this page normally available from stock except those coded *N*.

HJ-180

HJ-185

Electrothermal

HJ-202

HJ-230

WAX DISPENSING

HJ-180

WAX HEATER/DISPENSER. Comprises an anodised aluminium tank 18 cm diameter, 20 cm deep, with lever operated dispensing tap, removable gauze filter, lid, 500 watt heater and hydraulic thermostat range 40 to 74°C. Includes mains fuse, bimetal safety thermostat set to operate between 90 and 95°C and a temperature operated safety cut-out mounted in the air space between the tank and the steel outer case. With mains ON/OFF switch and neon indicator lamp. For 220/250V a.c. single phase supplies ... ... Each **£48·00** *f*

HJ-185

EMBEDDING TRAYS, polystyrene, with ten recesses each 20 × 20 × 13 mm deep. Overall dimensions 190 × 80 × 20 mm. In pack of 100 trays ... Pack **£2·35** *m*

PARAFFIN SECTION MOUNTING

HJ-200

PARAFFIN SECTION MOUNTING WATER BATH, *Electrothermal*, with black matt interior, which enables the sections to be seen, and black dust cover. Fitted with energy regulator to adjust temperature from ambient to 75°C. Inside dimensions 20 cm dia. × 6 cm deep. For 200/250V a.c. supplies. Power rating 450W. Each **£29·60** *m*

HJ-202

PARAFFIN SECTION MOUNTING WATER BATH, *Electrothermal*, as HJ-200 but fitted with thermostat to control temperature between 40° and 80°C. For 200/250V a.c. supplies ... ... Each **£37·40** *m*

ACCESSORY

HJ-210 **Slide drying rack,** aluminium, for 50 slides. Each **£2·20** *m*

VACUUM EMBEDDING

The single pan model comprises a removable tinned copper pan suspended in an electrically heated water bath, all mounted in an outer steel case. A plate glass cover with rubber washer seals the top of the pan, and a needle valve provides a means of evacuating the pan, and the outlet is suitable for connecting to 8 mm bore flexible vacuum tubing. An hydraulic thermostat controls the water bath temperature up to 82°C, and provision is made for inserting a mercury in glass thermometer.

The double pan model is as above but has two pans mounted side by side in the water bath. Each pan cover is fitted with a needle valve.

HJ-230

BATH, VACUUM EMBEDDING, as specification, with **single pan** 16·5 cm diameter by 15·0 cm deep. **Without thermometer.** For 230/250V 50 Hz single phase supplies. Loading 250W. Overall dimensions 30 × 30 × 28 cm. Weight 8·5 kg ... Each **£39·00** *fN*

HJ-235

BATH, VACUUM EMBEDDING, as specification, with **double pan** each 16·5 cm diameter by 15·0 cm deep. **Without thermometer.** For 230/250V 50 Hz single phase supplies. Loading 500W. Overall dimensions 56 × 30 × 28 cm. Weight 17 kg ... Each **£65·75** *fN*

REPLACEMENT PARTS

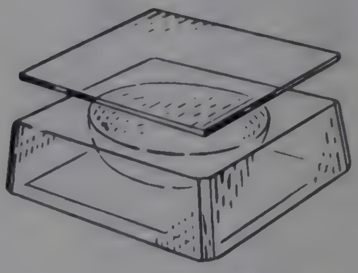
HJ-237 **Sealing washer,** for above baths ... Each **£0·50** *fN*

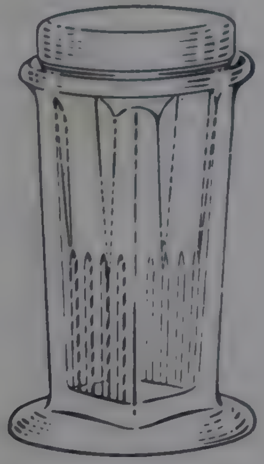
HJ-239 **Glass cover,** with hole 9·5 mm diameter but without needle valve ... ... Each **£1·95** *fN*

STAINING

***HJ-300**
STAINING BLOCK, glass, with cavity 30 mm dia. 10 mm deep. Complete with flat glass cover 37 mm square to minimise evaporation.
Ten **£1·90** Each **£0·25** c

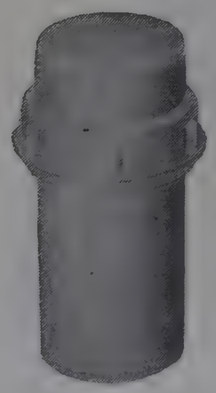
HJ-320
STAINING JAR, Coplin, borosilicate glass, with loose fitting cover, to take ten microscope slides, 75×25 mm, in pairs back to back.
Ten **£5·20** Each **£0·57** c

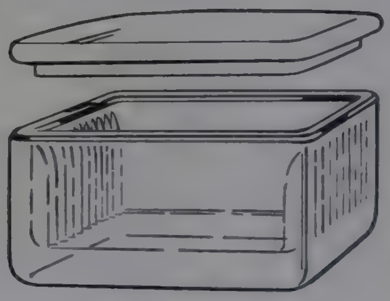

HJ-300


HJ-320

HJ-330
STAINING JAR, Wilson, polythene, with screw-on lid giving liquid tight seal and taking ten microscope slides, 75×25 mm, back to back. Particularly suitable for staining blood smears and for use with stains in volatile solvents ... ... Ten **£3·25** Each **£0·39** *m*

HJ-350
STAINING TROUGH, borosilicate glass, with loose fitting cover, to take twenty microscope slides, 75×25 mm, back to back ... Ten **£6·40** Each **£0·70** c

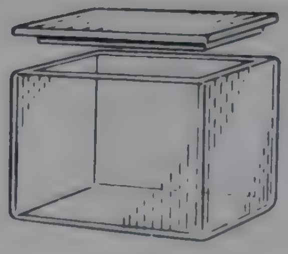

HJ-330

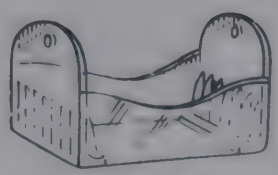

HJ-350

***HJ-390**
STAINING TROUGH, stout glass, with loose fitting cover. To take grooved tray HJ-400. Dimensions 83×103×72 mm high.
Ten **£14·40** Each **£1·60** *m*

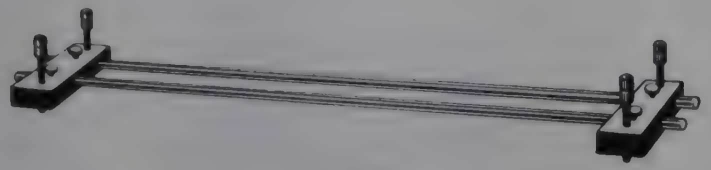
***HJ-400**
STAINING TRAY, stout glass, with ten grooves to take twenty microscope slides, 75×25 mm, back to back, and fitting into staining trough HJ-390. Eminently suitable for batch staining procedure, where sections can be dehydrated and stained in succession without any handling of slides.
Ten **£11·00** Each **£1·25** *m*

HJ-402 **Wire handle,** for lifting tray HJ-400 into and out of trough HJ-390 ... Ten **£0·80** Each **£0·15** b


HJ-390


HJ-400

All items on this page normally available from stock.



HJ-420

HJ-420

STAINING RACK, for slides, *Gallenkamp*, for use over laboratory sinks. Comprises two brass blocks drilled to take two glass rods to span sink and support microscope slides. Each block has milled head screws for clamping glass rod and levelling screws for gently rocking staining fluid or sections **Without glass rods.** Pair **£2·00** *b*

We shall be pleased to supply the rack complete with 6–7 mm dia. glass rods at a small extra charge. Please specify length required.

Gallenkamp
MADE IN ENGLAND

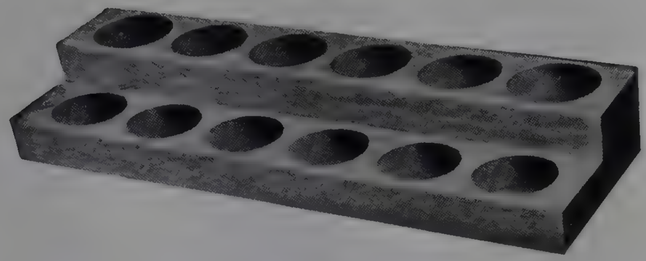
HJ-425

HJ-425

STAINING BOTTLE RACK, comprising stainless steel stand and 6×15 ml glass tubes with dropping pipettes.
Each **£1·90** c

REPLACEMENT PART

HJ-428 **Tube,** 15 ml, glass with dropping pipette.
Set of 6 **£0·85** c



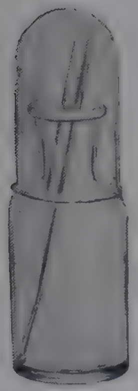
HJ-450

HJ-450

STAINING BOTTLE STAND, polished hardwood, for twelve dropping bottles, size 30 ml.
Ten **£16·00** Each **£1·80** c

Dropping bottles for stains see BT-550 *et seq.* in List No. sequence.

Trays for protecting bench tops from spilt stains, see BT-640 in List No. sequence.



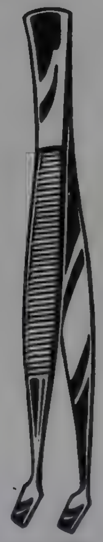
HJ-500

HJ-500

CANADA BALSAM BOTTLE, glass, with loose fitting glass cap and solid glass dropper. Capacity 30 ml.
Each **£0·31** *m*

***HJ-520**

IMMERSION OIL, a non-drying oil with refractive index $n_D^{25^\circ C}$ 1·5150 and very low fluorescent properties. Suitable for oil immersion lenses and as a transparent mounting medium. Supplied in bottle containing 1 fl. oz (approx. 28 ml) ... ... Each **£0·60** c



HJ-550

HJ-550

FORCEPS, nickel plated, with spatulate ends, for manipulating slides and cover glasses.
Ten **£2·70** Each **£0·33** *m*

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Most British Standards prepared or revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

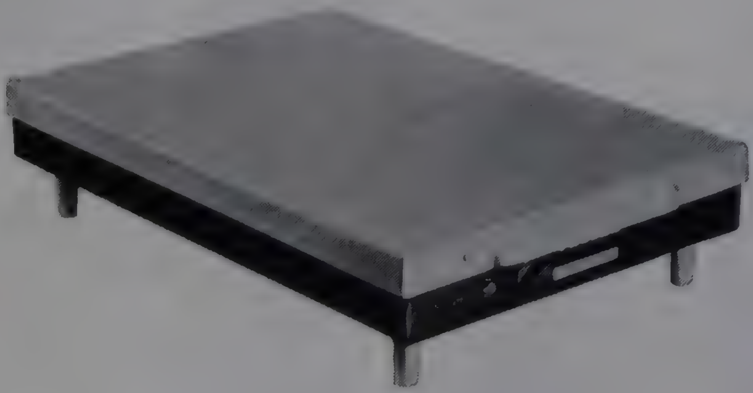
The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓐ or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

HJ-620

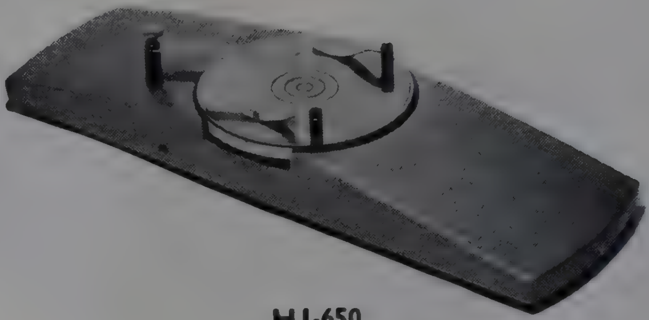
SLIDE DRYING PLATE, electrically heated, with a smooth enamelled steel top, dimensions 39·5×26·5 cm. With thermostat giving temperature control up to approximately 60°C and accurate to ±0·5degC. Power rating 150W. For 220/250V a.c. supplies. With indicator lamp and length of 3-core cable... ... Each **£5·25** *m*

Incubator for drying microscope slides, see IH-100, size 1.


HJ-620

HJ-650

RINGING TURNTABLE, for making permanent, superior finish, microscope slide preparations with asphaltum varnish. Comprises brass table rotating on a ball bearing fitting, with hand rests on both sides and an adjustable arm for steadying the brush.
Each **£10·75** *f*


HJ-650

SLIDES

HJ-700

SLIDES, MICROSCOPE, 75×25 mm, plain cut edges. Thickness 1·5/1·8 mm. In box of 100.
10 boxes **£2·60** Box **£0·32** *m*

HJ-710

SLIDES, MICROSCOPE, *Chance*, 75×25 mm, edges obscured. In box of 100.

Thickness	0·8/1·0	1·0/1·2	1·2/1·5 mm	
10 boxes	**£3·80**	**3·30**	**3·00**	*f*
Box	**£0·43**	**0·39**	**0·36**	

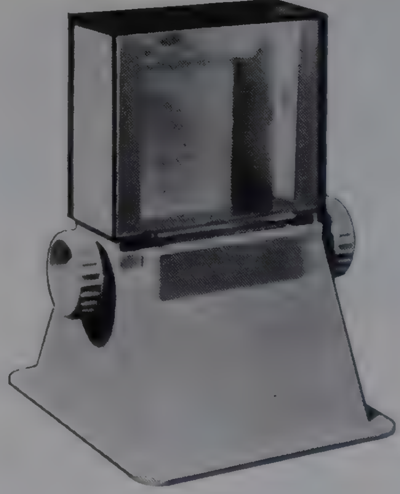
***HJ-720**

SLIDES, MICROSCOPE, 75×25 mm, edges finely ground. In box of 100.

Thickness	0·6/0·8	0·8/1·0	1·0/1·2	1·2/1·4 mm	
10 boxes	**£10·20**	**9·00**	**6·00**	**7·60**	c
Box	**£ 1·14**	**1·00**	**0·66**	**0·84**	

***HJ-730**

SLIDE DISPENSER for 75 × 25 mm microscope slides. Comprises a moulded plastics base and slide container with a close fitting, moulded, transparent cover. The container has capacity for about sixty 1 mm thick slides. These rest on a roller which may be turned, by means of knurled knobs on either side of the dispenser, to deliver one slide at the time through a slot. Until each slide has been removed, the next slide cannot be dispensed. Dimensions 10×12×14 cm high ... Each **£1·95** *m*


HJ-730

***HJ-740**

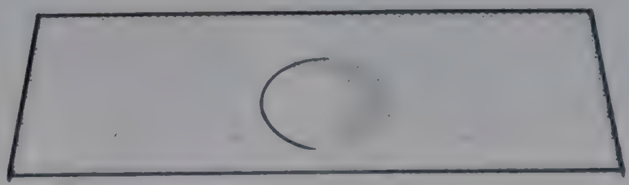
SLIDES, MICROSCOPE, edges finely ground, for large sections. Thickness 1·2/1·5 mm. In box of 100.

Dimensions	75×38	75×50 mm	
10 boxes	**£13·00**	**17·50**	c
Box	**£ 1·45**	**1·95**	

***HJ-750**

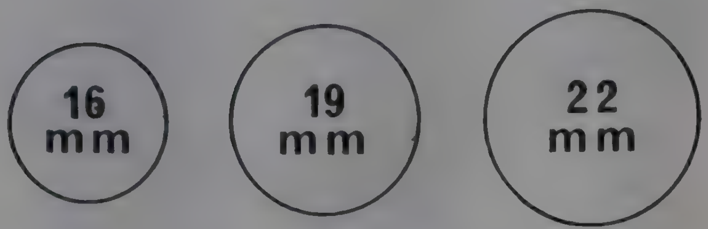
SLIDES, MICROSCOPE, 75×25 mm, edges ground and polished, with cavities for hanging drop techniques.

Thickness 1·2/1·5 mm No. of cavities	1	2	
100	**£6·40**	**10·00**	c
10	**£0·72**	**1·12**	
Each	**£0·14**	**0·18**	

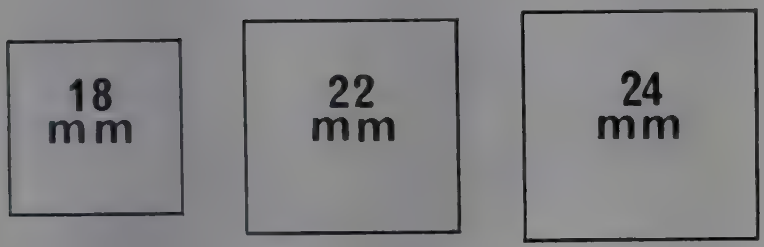

HJ-750

All items on this page normally available from stock.

COVER GLASSES AND CELLS

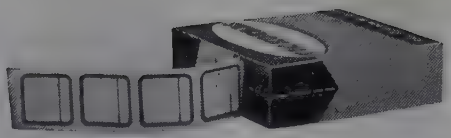


HJ-760 to HJ-762
Full size outlines



HJ-770 to HJ-772
Full size outlines

HJ-810



HJ-833

COVER GLASSES, *Chance* resistance glass, **circular shape.** In boxes of 100.

List No.	Thickness No.	mm	Diam. mm	100 boxes	10 boxes	Box	
				£	£	£	
HJ-760	3	0·25–0·35	16	19·50	2·15	0·28	m
			19	24·00	2·65	0·33	m
			22	28·50	3·15	0·38	m
HJ-761	1½	0·16–0·19	16	17·00	1·90	0·25	m
			19	20·50	2·25	0·29	m
			22	24·00	2·65	0·33	m
HJ-762	0	0·09–0·13	13	18·00	2·00	0·26	m
			16	19·50	2·15	0·28	m
			19	24·00	2·65	0·33	m
			22	28·50	3·15	0·38	m

When ordering please state size required.

COVER GLASSES, *Chance* resistance glass, **square shape.** In boxes of 100.

List No.	Thickness No.	mm	Square size mm	100 boxes	10 boxes	Box	
				£	£	£	
HJ-770	3	0·25–0·35	18	14·00	1·55	0·22	m
			22	21·50	2·40	0·31	m
			24	24·00	2·65	0·33	m
HJ-771	1½	0·16–0·19	18	12·60	1·40	0·21	m
			22	18·50	2·05	0·27	m
			24	22·50	2·50	0·32	m
HJ-772	0	0·09–0·13	18	14·00	1·55	0·22	m
			22	21·50	2·40	0·31	m
			24	24·00	2·65	0·33	m

When ordering please state size required.

HJ-780

COVER GLASSES, *Chance* resistance glass, **rectangular shape** No. 1½, 0·16–0·19 mm thick. In boxes of 100.

Dimensions	22×26	22×32	22×40	22×50 mm	
100 boxes	£21·00	27·50	34·00	45·00	m
10 boxes	£ 2·30	3·05	3·80	5·00	
Box	£ 0·29	0·37	0·44	0·56	

When ordering please state size required.

HJ-810

GLASS RING CELLS, for mounting thick specimens such as foraminifera, insect wings, etc., on microscope slides. May also be used for observing Brownian movement. In packs of 10.

Depth	3	5	7	15 mm	
Dia.	15	18	20	20 mm	
Pack	£0·75	0·75	0·75	0·75	a

HJ-833

LABELS, self-adhesive white, 22 mm square, ruled 4 lines and black border. In dispensing carton containing 500 labels ... ... Carton **£0·65** c

For other types of labels see **LABELS.**

Pencils for writing on glass microscope slides see PC-910 and PC-940 in List No. sequence.

All items on this page normally available from stock.

SLIDE STORAGE

For 75 × 25 mm slides

HJ-850

MICROSCOPE SLIDE HOLDER, *Gallenkamp*, aluminium, to take four slides. This holder is designed for storing microscopical preparations in storage cabinet HJ-860 or other standard filing cabinet for 125×75 mm cards. Supplied in pack of 25.

10 packs **£10·40** Pack **£1·16** c

HJ-860

MICROSCOPE SLIDE CABINET, all metal construction, with two drawers, side-by-side, sliding on polythene runners, each drawer taking 100 aluminium slide holders HJ-850. Total accommodation 800 slides. Designed to stack one on another, each cabinet is fitted with 4 rubber feet and a set of nuts and bolts for fixing. Dimensions 14×35×40 cm. With 200 slide holders HJ-850.

Each **£16·80** c

HJ-902

MICROSCOPE SLIDE FOLDER, with hinged flaps, numbered positions, to hold twenty slides.

Ten **£3·10** Each **£0·37** c

HJ-910

MICROSCOPE SLIDE BOX, pasteboard. To hold 12 slides ... ... Ten **£1·85** Each **£0·25** c

HJ-920

MICROSCOPE SLIDE BOX, covered imitation leather, with hinged lid and metal clasps. Two compartments to take a total of 100 slides.

Ten **£10·80** Each **£1·20** c

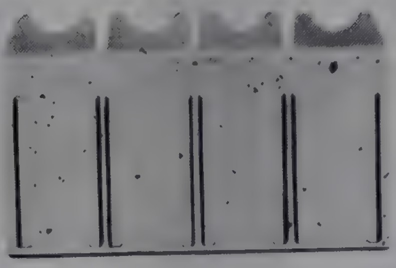
HJ-930

MICROSCOPE SLIDE CABINET, cardboard, covered imitation leather. With drop front and 12 loose trays each holding nine slides providing accommodation for 108 slides ... ... Ten **£11·00** Each **£1·20** c

HJ-950

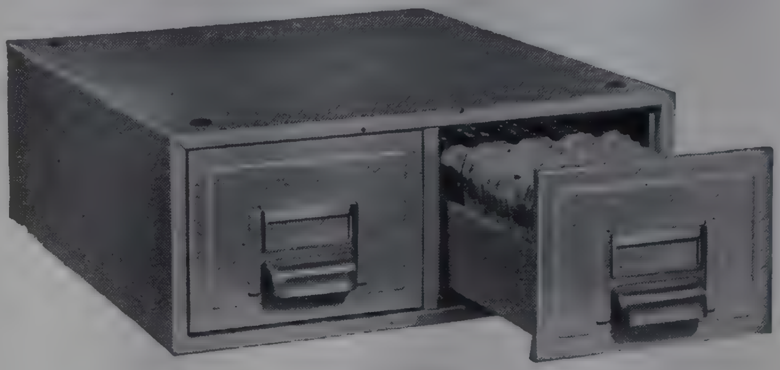
MICROSCOPE SLIDE CABINETS, all metal construction. With drawers, 3·3×29×41 cm deep divided into three compartments by fixed slotted divisions. Each drawer is fitted with a bar type handle and accommodates 300 slides.

No. of drawers	7	21	
To hold	2100	6300 slides	
Overall height	31	100 cm	
Each	£13·65	36·85	m

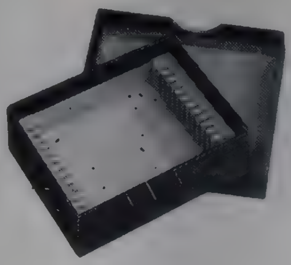


HJ-850

HJ-902

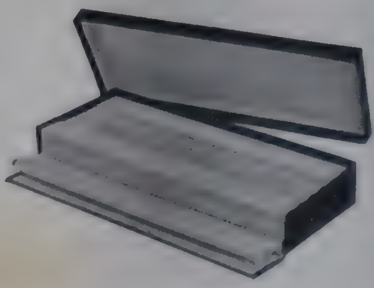


HJ-860



HJ-910

HJ-920



HJ-930

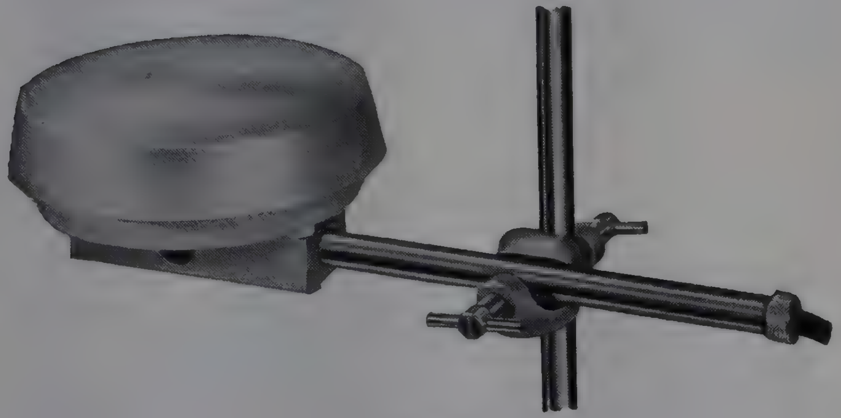
HJ-950

All items on this page normally available from stock.

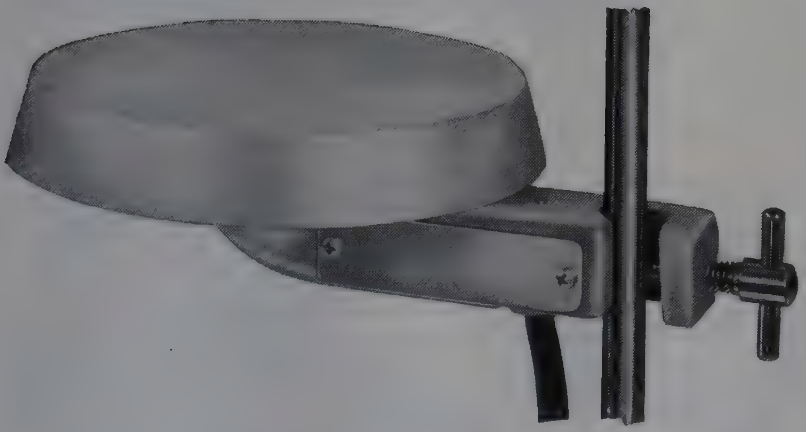
Gallenkamp LABORATORY

LABORATORY HOTPLATES of modern design and made in our own factory from highest quality materials and components. All plates (except HL-010 and those used with stirrer combinations) are of cast iron, machined flat and aluminium sprayed to resist corrosion.

PURPOSE-BUILT HEATING ELEMENTS are utilised to ensure maximum temperature uniformity over the whole of the working surfaces. Bench mounting hotplates are adequately insulated to avoid overheating of bench tops in normal use.



HL-010



HL-025

HOTPLATES, *Gallenkamp*, **circular, for retort stand mounting,** supplied with mains lead. For 220/240V a.c. supplies.
Weight 2·4 kg.

List No.	Diameter cm	°C Max.	Power rating W	Each	
				£	
†**HL-010**	12·5	350	350	**6·75**	*b*
HL-025	15	550	750	**10·00**	*b*

†**NOTE:** HL-010 has an aluminium alloy plate.

Available for other voltages to order.

Suitable **POWER REGULATORS** for in-line control see EC-810 *et seq.* under ELECTRICAL CONTROLS.

REPLACEMENT PARTS

HL-016	**Element,** 400W, for HL-010	Each	**£1·15**	c
HL-026	**Element,** 750W, for HL-025	Each	**£2·10**	c

HOTPLATES, *Gallenkamp*, **circular, for bench mounting,** supplied with mains lead. For 220/240V a.c. supplies.
Diameter 15 cm. Power rating 750W. Weight. 2·4 kg.

List No.	Control	°C Max.	Each	
			£	
HL-040	Energy regulator	550	**18·00**	*b*
HL-044	Thermostat	300	**19·25**	*b*

Available for other voltages to order.

HL-040

REPLACEMENT PART

HL-046 **Element,** 750W, for HL-040 and HL-044.
Each **£3·40** c

All items on this page normally available from stock.

HOTPLATES

ENERGY REGULATOR MODELS have arbitrary scales of 100 divisions. These regulators control the power input, and consequently the hotplate temperature, by periodically switching on and off the electrical supply. For details see 'POWER CONTROLLERS' under 'Electrical Controls'.

THERMOSTAT MODELS utilise reliable hydraulic thermostats with direct reading temperature scales. Surface temperature fluctuations in these models is as little as 5degC. Both types of model respond rapidly to changes of control settings.

HOTPLATES, *Gallenkamp*, **rectangular, for bench mounting,** supplied with mains lead. For 220/240V a.c. supplies. Dimensions 48×28 cm. Power rating 2 kW Weight 18 kg.

List No.	Control	°C Max.	Each	
			£	
HL-052	Energy regulator	400	**40·00**	*b*
HL-054	Thermostat	300	**42·00**	*b*

Available for other voltages to order.

HL-054 with hobs HL-055

ACCESSORY

HL-055	Hob, stainless steel, 48×10 cm, for rectangular hotplates. Provide useful extension to the working surface for simmering. One or two may be fitted.	Each	**£4·00**	*b*

REPLACEMENT PART

HL-056	Element, 2000W, for HL-052 and HL-054.	Each	**£7·00**	c

SURFACE TEMPERATURE MEASUREMENT

PC-980	Temperature indicating pencils.
PX-020 **PX-022**	Portable pyrometer with surface contact probe.
TJ-990	Surface contact dial thermometer.

COMBINED HOTPLATE/MAGNETIC STIRRERS

Reliable, compact assemblies incorporating variable speed stirrers which permit from gentle to vigorous stirring. Hotplates are of aluminium with sheathed heaters controlled by energy regulator to 450°C max. or thermostat to 300°C max.

Full details, ordering specifications, prices and accessories—see SS-615 to SS-620 under STIRRERS.

When ordering hotplates or replacement elements please state voltage of electricity supply.

SS-615 with rod

All items on this page normally available from stock.

HL-085

HL-085

HOTPLATE, electrically heated, 20 cm diameter solid top, 17 cm high, 2 kW loading. Maximum surface temperature about 500°C. With ventilated case, vitreous enamel finish. Weight 5 kg. Fitted with energy regulator control. For 230/250V a.c. single phase supplies.
Each **£5·75** *m*

HL-087

HL-087

HOTPLATE, as HL-085 but fitted with 3-heat switch for 230/250V a.c. single phase or d.c. supplies.
Each **£6·40** *m*

HL-090

HL-090

HOTPLATE, rectangular, electrically heated, with 2 kW heated plate 22×15 cm set into the metal top surface. Maximum surface temperature about 500°C. Overall dimensions 40×20×15 cm high. Weight 7 kg. Fitted with energy regulator control. For 230/250V a.c. single phase supplies only ... ... Each **£10·00** *m*

HL-110

HL-110

HOTPLATES, rectangular, electrically heated, machined cast-iron top plate, stainless steel body. Maximum surface temperature about 350°C. Fitted with energy regulator control. For 220/240V a.c. single phase supplies.

Power rating	1	2	3	kW
Plate size	30×23	46×30	69×30	cm
No. of elements	1	2	3	
Weight, approx.	10	21	29	kg
Each	**£28·40**	**34·90**	**55·60**	*m*

REPLACEMENT PART
HL-114 Heating element, 1kW ... ... Each £3·20 *m*

All above hotplates are available for other voltages to order. When ordering please state voltage and frequency of supply.

HD-230

RADIANT HEATER, with element totally enclosed in fused silica and completely protected from acid vapours. This heater is designed to enable heating to be carried out from above, thus ensuring rapid evaporation without loss by spattering. It may also be inverted and used as a normal hotplate.

For full details and price see entry in List No. sequence.

HD-262

INFRARED HEATER, for the rapid drying of small quantities of material, evaporation where splashing must be avoided, as in isotope work, or the application of local heat to an assembly such as a fractional distillation column. The sample temperature may be controlled by adjusting the distance from the lamp to the material.

For full details and price see entry in List No. sequence.

LOW TEMPERATURE HOTPLATE see HJ-620 in List No. sequence

All items on this page normally available from stock.

Gallenkamp HYDROGENATION APPARATUS

For measuring the hydrogen uptake of organic materials at atmospheric pressures

Both apparatuses use high quality stopcocks and connections for efficient gas tightness.

MICRO APPARATUS

For hydrogenations using 3 to 5 mg samples

A robust apparatus with interchangeable ground glass joints. Includes a reaction flask with rotating sidearm for the simple introduction of sample and a compensating flask, both flasks being efficiently shaken by motor driven eccentric. For high accuracy work the flasks should be submersed in the unheated water bath HR-112. The gas burette has an approximate capacity of 5 cm³. Overall dimensions 55 × 36 × 120 cm high. Requires approximately 3 kg mercury.

HR-100
MICRO HYDROGENATION APPARATUS, *Gallenkamp*, as specification, with instructions manual, but **without mercury or water bath** ... Each **£122·00** *b*

ACCESSORIES

HR-112	**Water bath,** with adjustable stand ...	Each	**£10·00**	*bN*
MF-932	**Mercury,** triple distilled. For details and prices see entry in List No. sequence.			

MACRO APPARATUS

For hydrogenations using 0·5 to 5 g samples

A robust apparatus, ideal for educational purposes, with flexible clear PVC joints. Includes two independent systems for simultaneous hydrogenations on the one apparatus. The samples may be agitated either by magnetic stirring or by using a flask shaker. Gas burettes with capacity either 100 cm³ or 500 cm³ may be used and only water is required as the displacing medium. Overall dimensions 31 × 61 × 105 cm high. Requires approximately 1·5 kg mercury.

HR-160
MACRO HYDROGENATION APPARATUS, *Gallenkamp*, as specification with Perspex safety screen and fitted with one 100 cm³ and one 500 cm³ burette. Includes instructions manual but **without mercury, stirrers or shakers** ... ... Each **£72·00** *b*

REPLACEMENT PARTS

HR-164	**Burette,** 100 cm³	Each	**£3·35**	*a*
HR-166	**Burette,** 500 cm³	Each	**£3·75**	*a*
HR-178	**Reaction flask,** with side mounted tap funnel and 29/32 socket	Each	**£3·70**	*a*
HR-186	**Water reservoir**	Each	**£2·45**	*a*
TX-774	**Tubing, PVC,** transparent, 8 mm bore. For price see entry in List No. sequence.			

ACCESSORIES

SS-425	**Handilab stirrer,** *Gallenkamp*,	For details and prices see entries in List No. sequence.
SS-444	with magnetic stirring rotor and polypropylene covered magnetised follower 12 mm. (Two	
SS-636	assemblies required) ...	
SD-110	**Shaker,**	
MF-932	**Mercury,** triple distilled.	

HYDROGEN-ION (pH) DETERMINATION

ALL APPARATUS FOR THIS PURPOSE IS LISTED UNDER

ELECTROCHEMICAL APPARATUS

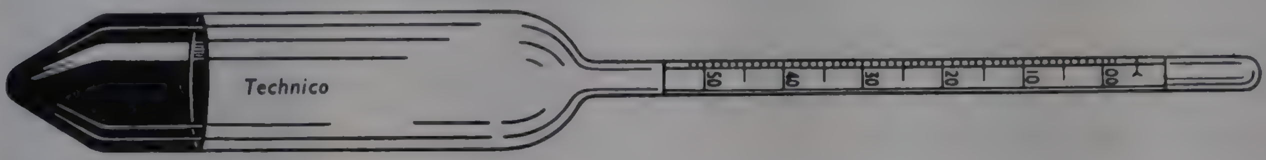
HR-100

HR-160 with accessories

Items on this page normally available from stock except those coded *N*.

Technico HYDROMETERS

REGD. TRADE MARK



HYDROMETERS TO BS 718

Total range 0·60 to 2·00 in steps of 0·05.
Tolerances ± one scale subdivision.

List No.						
Density g/ml 20°C	Specific gravity 60°/60°F	BS Series	Scale sub-division g/ml or sp. gr.	Overall length max mm	Each	
					£	
HT-100	**HT-102**	L50	0·0005	335	**2·00**	*a*N
HT-110	**HT-112**	M50	0·001	270	**1·30**	*a*N
HT-130	**HT-132**	S50	0·002	190	**1·25**	*a*N

NOTE: Any range from 0·60 to 2·00 can be adjusted for low surface tension liquids.

Any range from 1·00 to 2·00 can be adjusted for medium or high surface tension liquids.

When ordering specify List No., range required and surface tension.

HYDROMETERS TO ASTM D1298-IP 160 AND BS 718 SPECIAL TOLERANCE

Total range 0·60 to 1·10 in steps of 0·05.
For liquids of low surface tension.

List No.						
Density g/ml 15°C	Specific gravity 60°/60°F	BS Series	Scale sub-division g/ml or sp. gr.	Tolerance g/ml or sp. gr ±	Each	
					£	
HT-150	**HT-152**	L50SP	0·0005	0·0003	**2·00**	*a*N
HT-160	**HT-162**	M50SP	0·001	0·0006	**1·15**	*a*N

DENSITY BOTTLES

See DJ-530 to DJ-670 in List No. sequence.

PYKNOMETER TUBES

See DJ-750 to DJ-790 in List No. sequence.

SPECIFIC GRAVITY HYDROMETERS

Calibrated at 60°F

HT-200

HYDROMETER, *Technico*, shot weighted, covering range 1·00 to 2·00, subdivided in 0·01. Overall length 20 to 30 cm ... ... Each **£0·65** *a*

HT-220

HYDROMETERS, *Technico*, streamline, shot weighted, covering ranges indicated.

Range	0·70 to 1·00	1·00 to 1·50
Subdivisions	0·005	0·005
Length	25 to 30	30 to 35 cm

Each (both ranges) **£0·70** *a*

HT-240

HYDROMETERS, *Technico*, **two hundred degree series,** streamline, shot weighted. Ranges subdivided in 0·002. Overall length 22 to 24 cm. Ranges 0·60 to 1·00 adjusted for low surface tension (25–30 dynes/cm). Ranges 1·00 to 2·00 adjusted for medium surface tension (55 dynes/cm).

Range	0·60 0·80	0·80 1·00	1·00 1·20	1·20 1·40	1·40 1·60	1·60 1·80	1·80 2·00

Each (all ranges) **£0·69** *a*

HT-260

HYDROMETERS, *Technico*, **hundred degree series,** streamline, shot weighted. Ranges subdivided in 0·001. Overall length 22 to 24 cm. Ranges 0·60 to 1·00 adjusted for low surface tension (25–30 dynes/cm). Ranges 1·00 to 2·00 adjusted for medium surface tension (55 dynes/cm).

Range	0·60 0·70	0·70 0·80	0·80 0·90	0·90 1·00	1·00 1·10	1·10 1·20	1·20 1·30
Range	1·30 1·40	1·40 1·50	1·50 1·60	1·60 1·70	1·70 1·80	1·80 1·90	1·90 2·00

Each (all ranges) **£0·67** *a*

HT-280

HYDROMETERS, *Technico*, **fifty degree series,** streamline, shot weighted. Ranges subdivided in 0·001. Overall length 15 to 18 cm. Ranges 0·60 to 1·00 adjusted for low surface tension (25–30 dynes/cm). Ranges 1·00 to 1·65 adjusted for medium surface tension (55 dynes/cm).

Range	0·60 0·65	0·65 0·70	0·70 0·75	0·75 0·80	0·80 0·85	0·85 0·90	0·90 0·95
Range	0·95 1·00	1·00 1·05	1·05 1·10	1·10 1·15	1·15 1·20	1·20 1·25	1·25 1·30
Range	1·30 1·35	1·35 1·40	1·40 1·45	1·45 1·50	1·50 1·55	1·55 1·60	1·60 1·65

Each (all ranges) **£0·65** *a*

When ordering hydrometers please specify List No. and range required.

Items on this page normally available from stock except those coded *N*.

SPECIAL PURPOSE HYDROMETERS

HT-305

HYDROMETERS, Baume, streamline, shot weighted. Overall length 25 to 27 cm. **For heavy liquids.**

Conversion: $°B = 144{\cdot}3 - \frac{144{\cdot}3}{\text{sp. gr.}}$

Range	0 – 25	0 – 50	0 – 70 °B
Subdivided in	0·5	1·0	1·0

Each (all ranges) **£0·63** *a*

HT-320

HYDROMETERS, Twaddell, streamline, shot weighted, overall length 180 mm. Water is taken as 0°Tw and each Twaddell degree equals 0·005 sp. gr.

Conversion: Specific gravity = (°Tw × 0·005) + 1·000.

Range °Tw	0	24	48	74	102
	24	48	74	102	138

Each (all ranges) **£0·50** *a*

HT-340

HYDROMETER, accumulator, syringe type. Comprising transparent plastics syringe with suction bulb, delivery tube and shot-weighted hydrometer float, range 1·10 to 1·30 ... Ten **£4·80** Each **£0·53** c

HT-380

BRINOMETER, streamline, shot weighted, covering range 0 to 26% NaCl at 15°C. Overall length 25 cm, approximately ... ... Each **£0·60** *a*

HT-305
HT-320

HT-340

OTHER SPECIAL PURPOSE HYDROMETERS

Milk testing	see DC-900
Soil testing	see SH-160 et. seq
Water testing	see WR-250 et. seq

For details and prices see entries in List No. sequence.

HYDROMETER TRIAL JARS

HT-500

HYDROMETER TRIAL JARS, glass with spout, on foot.

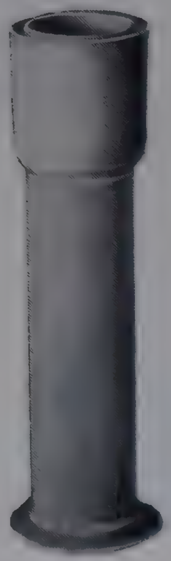
Height	15	20	25	30	30	35	45 cm	
Dia.	4	5	5	5	8	5	5 cm	
Ten	**£2·40**	**3·00**	**3·40**	**3·60**	**6·20**	**4·10**	**7·20**	c
Each	**£0·30**	**0·36**	**0·40**	**0·42**	**0·68**	**0·46**	**0·80**	

HT-520

HYDROMETER TRIAL JAR, polythene, with foot. When a hydrometer is inserted into the jar filled with liquid, the overflow is caught in an annular well at the top. Overall height 30 cm, diameter 5·5 cm.

Each **£2·50** c

HT-500


HT-520

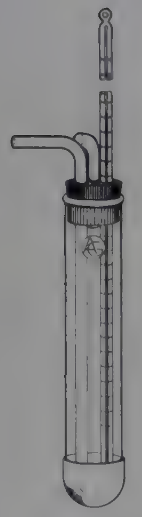
All items on this page normally available from stock.

DEW POINT HYGROMETERS

HV-010

HYGROMETER, Regnault, comprises a glass tube fitted with chromium plated copper thimble, rubber stopper and glass air tubes. **Without thermometer.** Each **£2·60** *a*

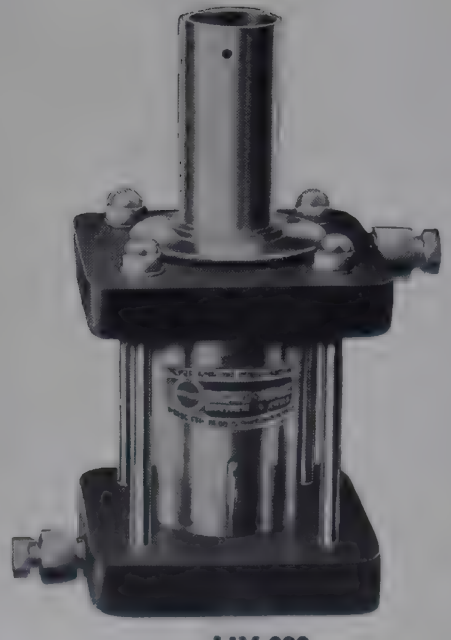
Suitable thermometer see TJ-174 in List No. sequence.



HV-010 with thermometer

HV-060

HV-040



HV-080

HV-040

HYGROMETER, dew point, for use with 10 ml samples or, for higher accuracy, with a continuous stream of gas. The sample chamber is separated from the ether vessel by a thin, polished stainless steel mirror upon which the dew forms. The bulb of the 12·5 cm scale, insulated stem thermometer is placed adjacent to the mirror. Ether is evaporated by bubbling air through it from a rubber aspirator, a constriction in the pipe giving close control of the cooling rate. With thermometer −15 to +35°C in 0·5degC ... ... Each **£10·00** *m*

ACCESSORIES AND REPLACEMENTS

HV-042 **Thermometers,** insulated pattern, with 12·5 cm scale.

Range	0 to 90°F	−15 to +35°C	
Subdivision	1degF	0·5degC	
Each	**£2·25**	**2·25**	*m*

HV-044 **Rubber aspirator,** for evaporating ether. Each **£0·75** *m*

ALNOR DEW POINT METER

A self-contained instrument for determining the dew point of gaseous samples down to −60°C. The sample, compressed to a known pressure, is made to expand adiabatically to atmospheric pressure, and the ratio of sample pressure to atmospheric pressure noted on the direct reading 'Pressure Ratio' gauge. If the sample has cooled to below its dew point a mist is observed in the illuminated pressure chamber. At a particular 'pressure ratio' the mist will just vanish, and by noting this ratio and the initial temperature the dew point is determined using the calculator provided. The simplicity of operation ensures repeatable readings and an accuracy of ±1·5degC can be obtained.

HV-060

DEW POINT METER, Alnor, as specification. With hand pump for gaseous samples having pressures not exceeding 3·5 kgf/cm², 'Pressure Ratio' gauge scaled 1·0 to 0·25, initial temperature thermometer, sample inlet and outlet nozzles, purging valve, glass fibre filter, spare gauge oil, battery and instructions for use. A recessed electrical socket and plug without cable are provided for 100/250V a.c. single phase supplies if mains operation is preferred ... ... Each **£160·00** *mN*

DEW POINT METER

For determination of moisture content of gases by measurement of the dew point down to −65°C. The results obtained with this instrument bear a very close relationship with moisture contents determined gravimetrically and electrolytically, but below −30°C the supplied comparison curves should be used.

CONSTRUCTION

A wide glass tube is clamped between two aluminium blocks into which the inlet and outlet gas connections are tapped. A highly polished chromium plated brass inner cup stands inside the tube and can be moved easily for cleaning and filling.

OFERATION

Gas entering the lower connection at approximately 1 litre/min impinges on the inner vessel which contains a liquid of low freezing point and a little solid CO_2. When a visible condensation occurs near the inlet jet, the thermometer is read and the moisture content calculated.

HV-080

DEW POINT METER, as specification, for measuring dew points down to −65°C, with thermometer scale span −120 to +30°C ... ... Each **£23·00** *f*

WET AND DRY BULB HYGROMETERS

HV-100
HYGROMETER, Mason, wet and dry bulb, to BS 2841 with two thermometers on polished zinc scale range 20 to 120°F in 1degF. In polypropylene frame with polythene reservoir and spare wicks ... Each **£2·90** c

HV-101
HYGROMETER, Mason, as HV-100 but scaled —5 to 50°C in 0·5degC ... ... Each **£2·90** c

REPLACEMENT PARTS

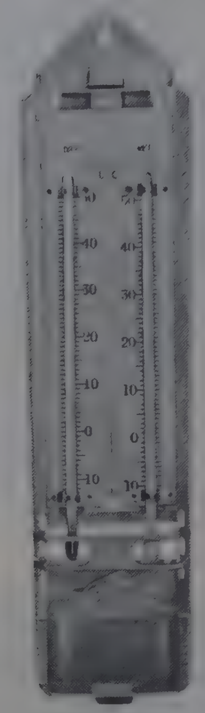
HV-102	**Wick,** cotton	Pack of 6	£0·40	c
HV-104	**Reservoir,** polythene	Each	£0·30	c

HV-110
HYGROMETER, Mason, wet and dry bulb, with two thermometers on polished zinc scale covering range 0 to 100°C in 1degC. In polypropylene frame with polythene reservoir and spare wicks ... Each **£3·80** c

HV-125
HYGROMETER, Mason, wet and dry bulb. With two thermometers NPL accuracy covering range 0 to 50°C in 0·5degC for ambient humidity measurements. The thermometers are divided on the stems with subsidiary scales on an opal glass background. In polypropylene frame with wick and polythene reservoir. Each **£7·50** c

REPLACEMENT PARTS for HV-110 and HV-125

HV-102 **Wick,** cotton
HV-104 **Reservoir,** polythene
} For prices see entries in List No. sequence.



HV-100
HV-101
HV-110
HV-125

HV-200
HYGROMETER, whirling, to BS 2842, with two solid stem lens front thermometers, scale length 10 cm, range 20 to 120°F in 1degF. The wooden frame has a plastics reservoir at one end into which the wick dips thus keeping the bulb continuously moistened. Complete with simple plastics slide rule ... Each **£4·50** *m*

HV-201
HYGROMETER, whirling, as HV-200 but with thermometers of range —5 to 50°C in 0·5degC. Each **£4·50** *m*

HV-200
HV-201

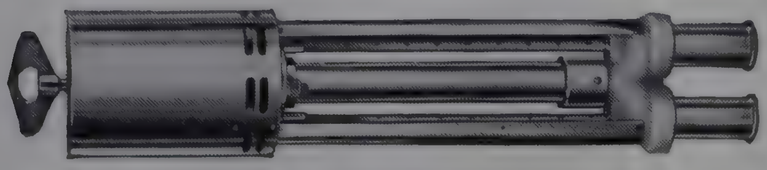
ACCESSORIES AND REPLACEMENTS

HV-202 **Thermometers.**

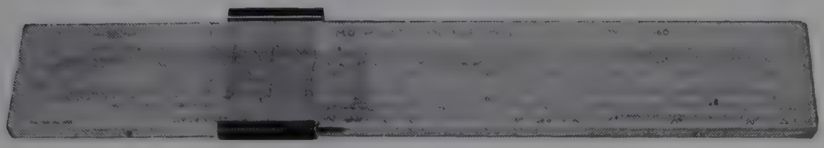
Range	20 to 120°F	—5 to 50°C	
Each	£0·75	0·75	*m*

HV-206	**Case,** leather, for HV-200	Each	£1·25	*m*
HV-208	**Wick,** cotton	Pack of 25	£0·15	*m*

All items on this page normally available from stock.



HV-240
HV-241



HV-260
HV-262

R.H.%
20
30
40
50
60
70
80
90
100
DRY
NORMAL
WET
RELATIVE
HUMIDITY
PER CENT

HV-400

THERMOHYGROGRAPHS

For daily and weekly recording
see TK-150 et. seq in List No. sequence.

0
10
20
30
40
50
60
70
80
90
100
PERCENTAGE RELATIVE HUMIDITY

HV-450

HV-240

HYGROMETER, Assmann, British Meteorological Office pattern, with spring driven fan to keep the wet bulb ventilated until the equilibrium point is reached. This provides very accurate readings and the results may be used as standard for comparing other humidity measuring instruments. The bulbs of the two solid stem thermometers, range 20 to 120°F in 1degF, are screened from radiation by polished and plated tubes, enabling the instrument to be used even in bright sunlight. The thermometers are held in a metal frame on which the fan is mounted. The instrument is contained in a polished wood case and is supplied with wick, wick moistener, a suspension rod, and simple plastics slide rule.
Each **£62·00** *mN*

HV-241

HYGROMETER, Assmann, as HV-240 but with thermometers of range —5 to 50°C in 0·5degC.
Each **£62·00** *mN*

ACCESSORIES AND REPLACEMENTS

HV-242	**Thermometers.**			
	Range	20 to 120°F	—5 to 50°C	
	Each	**£2·50**	**2·50**	*mN*
HV-246	**Wick,** cotton		Pack of 25 **£0·20**	*m*

HV-252

TABLES, for use with whirling and aspirated hygrometers, for converting wet and dry bulb readings to relative humidity values. For Fahrenheit thermometers.
Set **£0·30** *m*

HV-254

TABLES, as HV-252 but for use with Centigrade thermometers ... ... Each **£0·63** *m*

HV-260

CALCULATOR, humidity slide rule, to British Meteorological Office design for the determination of relative humidity, dew point, frost point, vapour pressure and absolute humidity from psychrometric readings. Temperature range covered —130 to +110°F. The slider is scaled on one side for screen hygrometers and on the other for whirling and aspirated hygrometers. With case and instructions ... ... Each **£5·00** *mN*

HV-262

CALCULATOR, as HV-260 but with temperature scale of —90 to +43°C ... ... Each **£5·00** *mN*

HV-400

HYGROMETER, PAPER. In 7·5 cm diameter plastics case, with scale 20 to 100% r.h. subdivided every 5% ... ... Each **£3·10** *m*

HV-410

HYGROMETER, PAPER, as HV-400 but with bimetallic dial thermometer covering range 30 to 130°F.
Each **£4·90** *m*

HV-450

HYGROMETER, HAIR, range 0 to 100% r.h., the scale occupying 100° of arc. In 10 cm diameter metal case with anodised dial... ... ... Each **£7·00** *m*

Items on this page normally available from stock except those coded *N*.

ICE MAKING AND CRUSHING

IC-255

ICE CUBE MAKER, an efficient, attractively styled unit with six quick release ice trays to produce 108 ice cubes every 3½ hours. Total capacity approximately 20 litres. The refrigerating unit has a hermetically sealed system with a low consumption compressor. For 205/245V 50 Hz single phase supplies. Dimensions 64 × 35 × 44 cm. Weight 33 kg ... ... Each **£64·50** *m*

IC-255

ICE FLAKE MAKING MACHINE, automatic, for continuous production and storage of ice flakes. The quoted ice production rates are maxima and occur with water supply at 5degC and an ambient temperature 10°C. At higher temperatures the production is less. Storage bins have stainless steel liners. For 220/240V 50 Hz supplies.

	***IC-277**	***IC-282**	
Model No.	DF-4-6E	SF-75WSH	
Ice production	60 kg/24 hr	100 kg/24 hr	
Bin capacity	40 kg	45 kg	
Bin door	front opening	top sliding	
Compressor (air cooled)	⅕ hp	¼ hp	
Dimensions	58 × 62 × 112 cm high	87 × 66 × 112 cm high	
Net weight	98 kg	150 kg	
Each	**£332·00**	**453·00**	*f*

Price includes installation in the U.K. but does not include additional plumbing and electrical wiring which may be required on site.

IC-282

REFRIGERATORS

Conservators	see	RJ-610 et. seq
General purpose	see	RJ-640
Low temperature	see	RJ-810 et. seq
Under bench fitting	see	FU-995 et. seq

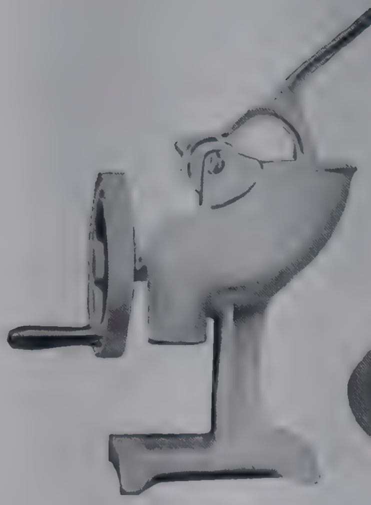
For details and prices see entries in List No. sequence

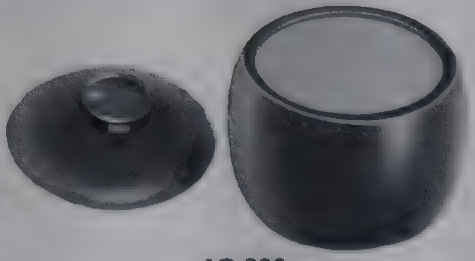
IC-320

ICE SHAVING MACHINE, hand operated, for reducing ice lumps to a fine powder. Comprises 10 cm diameter, aluminium alloy hopper, with stainless steel rotating cutting blades, mounted on a base 23 × 13 cm. Capacity 7 kg (15 lb) ... ... Each **£27·50** *mS*

IC-330

ICE STORAGE CONTAINER, double walled, with polythene liner and polystyrene outer case and lid. Internal dimensions approx. 13 cm dia. × 10 cm deep. Nominal capacity 1 litre.
Ten **£8·80** Each **£0·98** *cS*


IC-320


IC-330

Items on this page coded *S* normally available from stock.

Gallenkamp ANHYDRIC

FAN CONVECTION MODEL

A range of high quality anhydric incubators, for use in the fields of biology and microbiology, bacteriology, virology, epidemiology, pathology and biochemistry.

- **Temperature range 7degC above ambient to 100°C**
- **Direct reading *Compenstat* (solid state) temperature control with safety thermomstat**
- **Stainless steel interior**
- **Toughened plate glass inner door with neoprene gasket**
- **Unitised control panel for easy servicing and recessed to minimise accidental alteration of controls**
- **No water jacket leakage hazard**

IH-100

For suitable **FLOOR STANDS** see **OV-480** to **OV-484** in List No. sequence.

DESIGN

Exterior. Easily cleaned and free from dust traps, the exterior is finished in hard wearing light grey stoved enamel. The outer door has a rubber magnetic gasket and the inner glass door closes on a neoprene gasket.

Interior. Constructed from chemically resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and an easily removed baffle at the rear which guards the fan and heater.

Shelves. The 12·5 mm spaced grid steel wire shelves are heavily nickel and chromium plated to BS 1224 Grade 1S.

Basket shelves with grid sides 7 cm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the incubator with minimum heat loss.

Air circulation and heating. Air drawn from the centre of the incubator is recirculated to the top and bottom of the workspace by the rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is screened from the workspace by the baffle.

Temperature controls. A direct reading *Compenstat* (solid state) maintains excellent and reliable temperature control. An independent safety thermostat, with warning lamp, is fitted.

Atmosphere control. An adjustable ventilator in the top of the incubator can be closed to shut off flow of outside air. This ventilator can also be lifted out to provide a 2·8 cm dia. port through which tubes may be fitted to feed gases other than air (e.g. CO_2, N_2, etc.) into the working space. The ventilator incorporates a clip to retain a mercury in glass thermometer.

INCUBATORS

FAN CONVECTION MODEL (continued)

PERFORMANCE

Data when tested according to BS 2648† methods.

Size No.		1	2	3
Temperature range		7degC above ambient to 100°C		
Temperature fluctuation	at 38°C	0·1	0·1	0·1degC
	at 100°C	0·1	0·1	0·1degC
Temperature variation	at 38°C	±0·25	±0·25	±0·5degC
	at 100°C	±1·0	±1·5	±2·0degC
Time to heat	to 38°C	15	25	20 min
	to 100°C	65	100	100 min
Recovery time after door opened one minute	at 38°C	6	6	6 min
	at 100°C	20	20	20 min

†Although British Standard 2648 is intended for testing unloaded drying ovens, the test methods form an excellent basis for comparing incubators.

DIMENSIONS

Size No.	1	2	3	
	H W D	H W D	H W D	
Internal	46×40×36	61×51×46	76×61×46	cm
	18×16×14	24×20×18	30×24×18	in
Overall	81×58×68	96×68×79	112×79×79	cm
	32×23×27	38×27×31	44×31×31	in
Shelves Size	38×34	48×44	58×44	cm
	15×13½	19×17½	23×17½	in
Number supplied	3	3	4	
Number of positions	4	5	6	
Interval between positions	11	11·5	12	cm
	4¼	4½	4¾	in
Max. shelf area	0·5	1·0	1·5	m²
	5·4	10·8	16	ft²
Weight, net	55	77	93	kg
	120	170	204	lb
Power rating, max.	250	250	500	W

IH-100

INCUBATORS, anhydric, ***Gallenkamp,*** **fan convection,** with direct reading *Compenstat* (solid state), safety thermostat, stainless steel interior, toughened glass inner door, shelves, mains and load indicator lamps. **Without thermometer.** For single phase supplies.

Size No.	1	2	3	
For 220/240V 50 Hz	£142·00	163·00	186·00	*b*
For 200/210V 50 Hz	£143·00	164·00	188·00	*bN*
For 110/120V 60 Hz	£143·00	164·00	188·00	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

IH-105 **Heaters.**

Incubator Size No.	1	2	3	
Each	£2·40	2·40	2·40	b

OV-172 **Fan motor**
OV-174 **Shelves**
} For prices see entries in List No. sequence.

ACCESSORIES

IH-110 **Thermometer,** red reflecting mercury, scale span 10 to 60°C in 1degC ... Ten £13·00 Each £1·45 c

*IH-112 **Dial temperature indicator,** range 0 to 110°C. Each £3·25 c

LX-110 **Lubricant,** for motor bearings.
OV-176 **Basket shelves** ... ...
} For details see entries in List No. sequence.

Items on this page normally available from stock except those coded ***N.***

Gallenkamp ECONOMY INCUBATOR

An economically priced incubator for use in schools and technical colleges

- **Temperature range 5degC above ambient to 80°C**
- **Gravity convection**
- **Aluminium interior**
- **Inner glass door**
- **Direct reading thermostat**

IH-150

CONSTRUCTION

The outer casing is of sheet steel finished in light grey enamel. The interior is of polished aluminium with fixed shelf positions. The walls and door are insulated with fibreglass, the outer door has a heat-break, and the inner glass door closes on to a neoprene gasket.

HEATING AND CONTROL

The heating elements are totally enclosed and covered by an aluminium plate and there are no electrical connections within the working space. A hydraulic thermostat with a scale calibrated in °C gives good temperature control. The control knob has an OFF position and a neon lamp indicates when the heaters are on.

PERFORMANCE

Size No.	1	2
Temperature range	5degC above ambient to 80°C	
Fluctuation at 38°C	0·5	0·5degC
Variation at 38°C	2	3degC

DIMENSIONS

Size No.	1	2	
	H W D	H W D	
Internal	33 × 48 × 33	47 × 46 × 40	cm
	13 × 19 × 13	18½ × 18¼ × 15¾	in
Overall	56 × 59 × 49	70 × 57 × 59	cm
	22 × 23 × 19½	27½ × 22½ × 23½	in
Shelves			
Size	48 × 30	48 × 40	cm
	19 × 11½	19 × 16	in
Number supplied	2	3	
Number of positions	4	6	
Interval between positions	6·5	6·5	cm
Weight, net	24	26	kg
Power rating, max.	150	250	W

IH-150

INCUBATORS, anhydric, *Gallenkamp,* **Economy,** with gravity convection, as specification, for a.c. single phase supplies.

Size No.	1	2	
For 220/240V	**£61·00**	**80·00**	*b*
For 200/210V	**£61·50**	**80·50**	*bN*
For 110/120V	**£61·50**	**80·50**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

IH-154 **Heating element.**

Incubator Size No.	1	2	
Each	**£2·60**	**2·60**	*b*

ACCESSORIES

OV-014	**Extra shelves, sizes 1 and 2** ...	For prices see entries in List No. sequence.
TJ-050	**Thermometer,** range −10 to 110°C	

For suitable **FLOOR STAND** see **OV-482** in List No. sequence.

Items on this page normally available from stock except those coded ***N.***

Gallenkamp COOLED INCUBATORS

Temperature range 0° to 45°C approximately

- *Compenstat* **(solid state) controlled**
- **High and low temperature safety thermostats**
- **Accommodates over 100 B.O.D. bottles**
- **Efficient ducted air circulation by fan**
- **Integral dial thermometer in door**
- **Magnetic door gasket**

CONSTRUCTION

The outer case is of steel, rust-inhibited and stove enamelled white. The liner is a smooth plastics moulding fitted with shelf supports allowing wide ranges of shelf positions and spacings. Four 18 mm grid, plated steel shelves are supplied. Three fit in the shelf supports; the fourth is not full depth and may be removed or fitted in front of the lower internal projection. A door-operated interior illuminating lamp is fitted.

PERFORMANCE

Minimum temperature	0°C in 30°C ambient temperatures
	5°C „ 35°C „ „
	10°C „ 40°C „ „

Note: The incubator is unsuitable for use in ambient temperatures above 40°C.

Maximum temperature	45°C at all ambient temperatures

Approximate times to stability for unloaded incubator in 20°C ambient:

Heating 40 min from 20°C to 45°C.

Cooling 60 min from 20°C to 0degC.

Fluctuation	less than 0·1degC
Variation	±1degC

DIMENSIONS

	H W D
Internal	see diagram on page 407
Overall	127 × 55 × 56 cm
Shelves	Three 45×39·5 cm One 45×25 cm Nine positions at 6·5 cm spacing
Capacity, gross	180 litres (6·5 ft³)
Weight, net	60 kg (132 lb)
Power rating, max.	375W

OPERATION

Temperature is controlled by a direct reading *Compenstat* (solid state) thermostat with direct reading scale. Heating is by a sheathed heating element.

Cooling is provided by a refrigerating system with smooth running hermetically sealed compressor. The evaporator coil is mounted with the fan, heater and thermostat elements, in the air duct at the top of the working space.

The refrigerating system is run continuously when operating at temperatures below or near ambient, but may be switched off when working at higher temperatures. The *Compenstat* control head, refrigerator switch and the mains and heater indicator lamps are mounted in the control compartment on top of the incubator. High and low temperature adjustable safety thermostats are fitted. Working temperature is measured and indicated by a dial thermometer, range −20°C to +50°C, mounted in the door.

Suitable for Biochemical Oxygen Demand (B.O.D.) testing.
Incubation serum studies.
Enzyme testing.
Fruit fly cultivation.
Tissue culture work.
Immunology.
Long term sample storage.
Specimen conditioning.
Service testing at low ambient temperatures.

IH-270

IH-270

INCUBATOR, COOLED, *Gallenkamp*, as specification, with *Compenstat* (solid state), high and low temperature safety thermostats, door thermometer, shelves, ducted air circulation by fan, sheathed heating element and hermetically sealed compressor refigeration unit. Suitable for operation in ambients up to 40°C.

For 220/240V 50 Hz single phase supplies. Each **£180·00** *g*

For 110/120V 60 Hz single phase supplies. Each **£190·00** *gN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

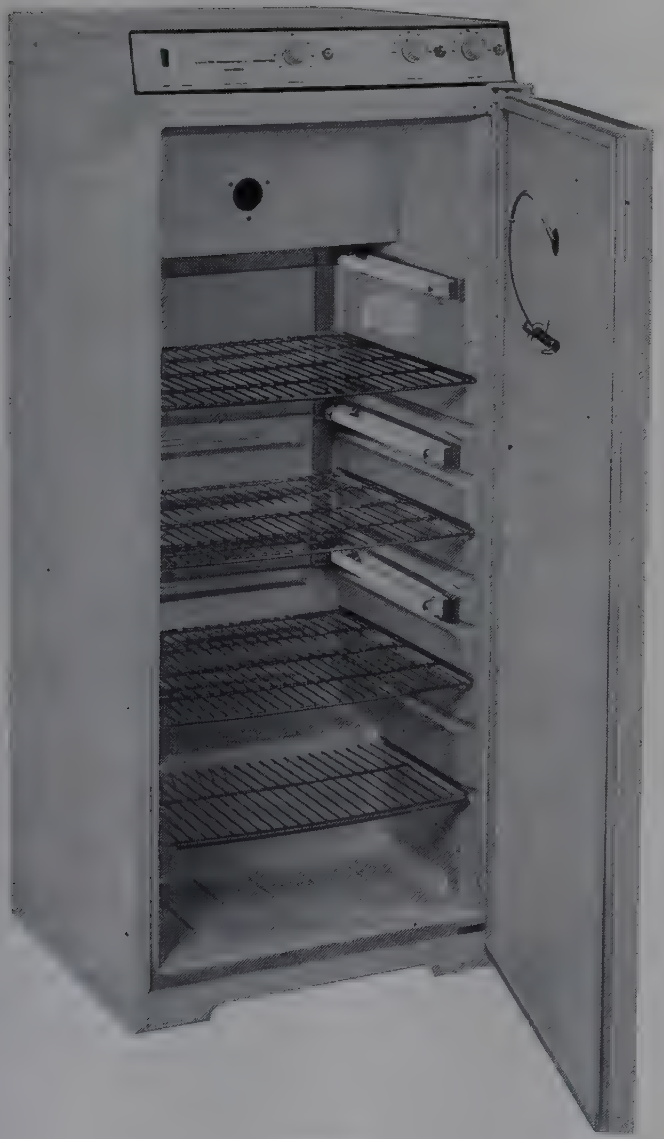
IH-274	**Shelf,** 46×39·5 cm	Each **£1·35** *b*
LX-110	**Lubricant** for fan motor bearings. For price see entry in List No. sequence.	

(continued overleaf)

Gallenkamp COOLED INCUBATORS

INCUBATOR WITH FLUORESCENT ILLUMINATION

- **Fitted with six 8W fluorescent lamps**
- **Even illumination on equally spaced shelves**
- **High degree of temperature control accuracy**



IH-280

APPLICATIONS

The Cooled Incubator with fluorescent interior illumination offers broad facilities for those engaged in studies of photosynthesising organisms. The illumination is of sufficient intensity to reproduce daylight growing conditions. A time switch may be fitted externally to provide diurnal cycling. Extremes of temperature are attainable within the cabinet, enabling the user to study the growth of organisms under tropical or temperate and summer or winter conditions independent of ambient temperature.

Plant growth and oceanographic studies as well as work with algae, moulds and blue-green algae are all practicable within the cabinet. With the illumination switched off, all the functions of a conventional cooled incubator are offered. For example, the incubator may be used to grow organisms for a set period and then, by means of an externally fitted time switch, the refrigerator can be switched on to suspend further growth for as long as required.

This type of incubator is finding increasing use in many biology, botany, virology, oceanography, water pollution, sewage, agriculture and food research laboratories.

CONSTRUCTION

As IH-270 but fitted with six 12 in, 8W fluorescent lamps mounted three on either side of the workspace. The lamps are controlled by a switch on the control box and the lamp ballasts are mounted clear of the working space to prevent their uncontrolled heat from entering the incubator.

PERFORMANCE AND DIMENSIONS

As IH-270 except the following:

Minimum temperature with lamps on	10°C in 30°C ambient
	15°C ,, 35°C ,,
	20°C ,, 40°C ,,
Power rating, max.	425W

The intensity of illumination is 75 lumens/ft^2 on any of the three equally spaced shelves in an unloaded incubator.

IH-280

INCUBATOR, COOLED, *Gallenkamp*, as specification with **interior fluorescent illumination.**

For 220/240V 50 Hz single phase supplies. Each **£220·00** *g*

For 110/120V 60 Hz single phase supplies. Each **£230·00** *gN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

VS-629 **Lamp, fluorescent,** 8W. For price see entry in List No. sequence.

When ordering replacement parts please state serial number of incubator and supply voltage.

ACCESSORIES

IH-274 **Shelf,** 45 × 39·5 cm.

LX-110 **Lubricant,** for fan motor bearings.

For prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N.*

Gallenkamp COOLED INCUBATORS

INCUBATOR FOR INCUBATION IN CO_2

APPLICATIONS

This incubator meets the needs of laboratories in which cell cultures, tissue cultures and organ cultures are grown for physiological, immunological, radiobiological, virological or other studies.
The most suitable conditions for the cultivation of animal cells are provided when the culture medium is buffered with phosphate-bicarbonate mixtures and the medium is in equilibrium with carbon dioxide in the gas phase. Since such conditions are essential for organ cultures, one example of the use of this incubator is for the cultivation of organ cultures used to isolate fastidious viruses.
The incubator also has other applications in biological sciences. It can, for example, be used for the cultivation of bacteria that grow best in the presence of 5% carbon dioxide.
The size of the incubator makes it suitable for work on a relatively large scale whilst its simplicity and low cost bring it well within the reach of the smaller laboratory.

CONSTRUCTION

As IH-270 but with an inlet nozzle at the rear of the control box provides a means of admitting CO_2 or air/CO_2 mixtures and a similar nozzle is provided for monitoring CO_2 concentration. A 6 mm thick inner Perspex door minimises atmosphere loss when the outer door is opened to inspect samples. A dial temperature indicator range 0 to 50°C is fitted to the inside of the inner door.
PERFORMANCE AND DIMENSIONS as IH-270.

IH-290

INCUBATOR, COOLED, *Gallenkamp*, for incubations in CO_2 enriched atmospheres, as specification, fitted with gas inlet and outlet nozzles, dial temperature indicator range 0 to 50°C and unsealed inner Perspex door. **Without integral dial thermometer in the main door.**
For 220/240V 50 Hz single phase supplies.
Each **£210·00** *g*

For 110/120V 60 Hz single phase supplies.
Each **£220·00** *gN*

ACCESSORIES

IH-274	**Shelf,** 45 × 39·5 cm.	For prices see entries in List No. sequence.
LX-110	**Lubricant,** for fan motor bearing.	

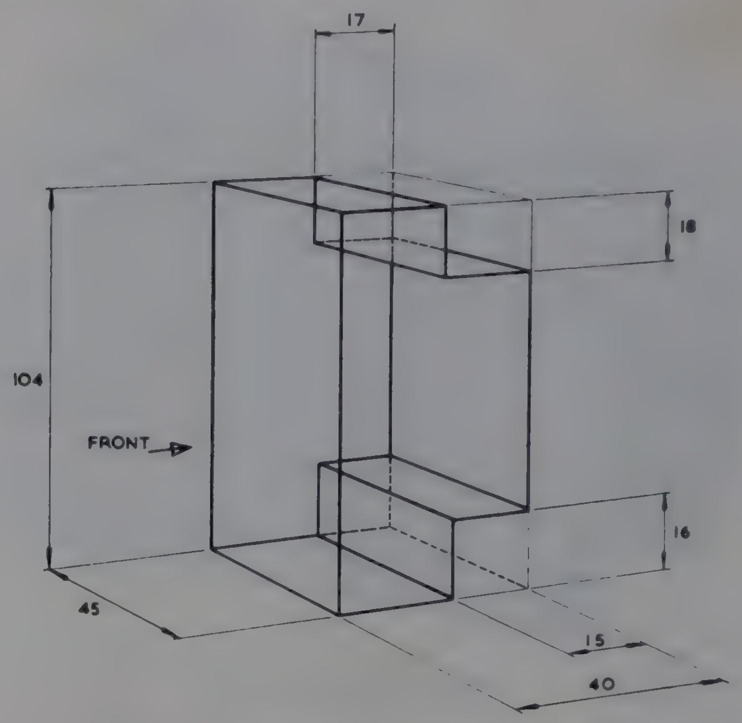


Diagram showing approximate internal shape and dimensions in cms of Cooled Incubators IH-270, IH-280 and IH-290.

CO_2 GAS ANALYSERS

GC-020 to **GC-120**	Orsat Gas Analysers
GC-400 to **GC-414**	Lloyd Gas Analysers

For details see entries in List No. sequence.

CO_2/AIR BLENDER

- **For control of CO_2/air incubations**
- **Installed in minutes—easy to adjust**

IH-345

BLENDER, CO_2/AIR, *Gallenkamp*, for measuring and controlling carbon dioxide/air mixtures into incubators and environmental chambers. Incorporates needle valves, inlet nozzles and flowmeters for carbon dioxide and air and a single outlet nozzle for the gas mixture.
The flowmeters are scaled 0·05 to 0·6 l/min CO_2 and 0·5 to 7·0 l/min air respectively and a by-pass allows CO_2 to be injected rapidly into the chamber. In metal case for bench mounting. All nozzles accept 6·5 mm bore flexible tubing.

Overall dimensions	20 × 25 × 32 cm high.
Weight, net	4 kg.

Each **£60·00** *b*

ACCESSORIES

TX-772	**Tubing,** PVC, size N6·5	For details and prices see entries in List No. sequence.
CP-285	**Clip,** maximum diameter 14 mm ...	
GD-510	**Pressure regulator** for CO_2 ...	
GD-530	**Pressure regulator** for air ...	

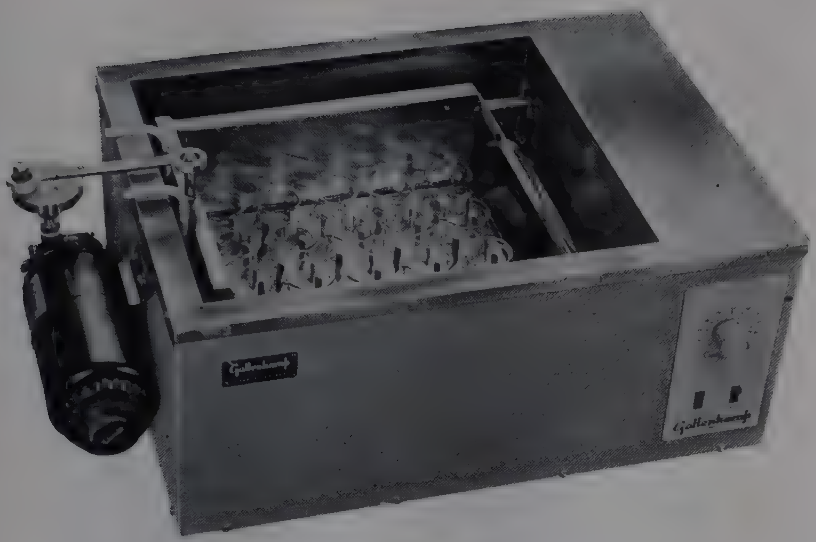
Gallenkamp
CO₂/AIR MIXER

IH-345

All items on this page normally available from stock.

Gallenkamp SHAKING

- Thermostatic control up to 80°C
- Variable shaking speeds to 200/min
- Variable stroke length
- Stainless steel construction



IH-350 with
IH-352 and WF-404

PERFORMANCE

Temperature range	
Without cover	Ambient† to 50°C
With cover	Ambient† to 80°C

(† For operation near or below ambient temperature the cooling coil must be fitted and supplied with cold water.)

Temperature fluctuation	0·1degC
Stroke lengths	12·5, 25 or 38 mm
Shaker speed	Continuously variable from 50/min to maxima as follows:

Stroke		Max. speed
12·5 mm	...	200/min
25 mm	...	140/min
38 mm	...	100/min

DIMENSIONS

	H		W		D
Overall	22	×	50	×	35 cm
	8½	×	19½	×	14 in
Bath interior	16	×	35	×	30 cm
	6½	×	14	×	12 in
Rack size			28	×	23 cm
			11	×	9 in
Power rating, max.	500W				

SHAKING REACTION INCUBATOR

- Bath capacity 15 litre
- Direct reading *Compenstat* (solid state) control to within 0·1degC
- Airtight covers for anaerobic working

IH-350

INCUBATOR, SHAKING REACTION, *Gallenkamp*, comprising stainless steel water bath, thermostatically controlled by direct reading *Compenstat* (solid state), heated by a 500W metal-sheathed element and with rack carriage and drive motor with speed control having an OFF position. Includes mains switch and load indicator lamp. **Without racks, covers or other accessories.** For single phase supplies.

For 220/240V 50 Hz	Each	£122·00	*b*
For 200/210V 50 Hz	Each	£123·00	*bN*
For 110/120V 60 Hz	Each	£123·00	*bN*

When ordering please state voltage and frequency of supply

REPLACEMENT PART

WF-402 **Heater, 500W.** For details and price see entry in List No. sequence.

ACCESSORIES

SAMPLE CONTAINER RACKS, stainless steel.

List No.	Type of container	Capacity of container	No. of containers	Each	
				£	
IH-352	Conical flasks or beakers	25 ml	20	**4·20**	*b*
IH-354	Conical flasks	50 ml	10	**3·70**	*b*
IH-355	,, ,,	100 ml	8	**6·25**	*b*
IH-357	,, ,,	150 ml	6	**4·80**	*b*
IH-358	,, ,,	250 ml	4	**4·10**	*b*
IH-359	Test tubes	125 × 16 mm	48	**7·10**	*b*

IH-360 **Cover, gabled, stainless steel,** covering entire bath. **Not airtight** ... ... Each **£12·25** *b*

IH-362 **Cover, gabled, stainless steel,** covering half rack (two may be fitted) and forming airtight water seal. With gas tubulure, for **anaerobic working** ... Each **£6·90** *b*

WF-404	**Cooling coil**... ... ...
WF-406	**Thermometer holder** ... ...
IH-110	**Thermometer,** scale span 10°C to 60°C....
TJ-440	**Thermometer,** scale span 0°C to 110°C....
MK-055	**Beaker,** 25 ml ... ...
BJ-625	**Beaker,** 50 ml ... ...
FJ-050	**Flasks,** conical, 25, 50, 100, 150 and 250 ml.
TF-180	**Test tube,** 125 × 16 mm ... ...

For prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

REACTION INCUBATORS

- **Applications include :**
  Shaken culture techniques
  Chemical and biological reactions
  Reaction kinetics studies

IH-370

SHAKING REACTION INCUBATOR

- **Bath capacity 70 litre**
- **Up to 65 samples simultaneously shaken**
- **Contact thermometer control to within 0·2degC**

IH-370

INCUBATOR, SHAKING REACTION, *Gallenkamp*, comprising stainless steel water bath, thermostatically controlled by adjustable contact thermometer in conjunction with a 3-heat power switch, heated by two 1 kW metal-sheathed elements, with rack carriage, drive motor and speed control having an OFF position. With mains and load indicator lamps. **Without racks, cover or other accessories.** For single phase supplies.

For 220/240V 50 Hz	Each	**£260·00**	*b*
For 200/210V 50 Hz	Each	**£275·00**	*bN*
For 110/120V 60 Hz	Each	**£275·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-472	**Heater, 1000W, inner ...**	For details and prices see entries in List No. sequence.
WF-474	**Heater, 1000W, outer ...**	
TM-866	**Contact thermometer, 0—100°C ... ...**	

ACCESSORIES

SAMPLE CONTAINER RACKS, stainless steel.

List No.	Type of container	Capacity of container	No. of containers	Each	
				£	
IH-378	Conical flasks	50 ml	65	27·00	*b*
IH-380	,, ,,	100 ml	45	24·50	*b*
IH-382	,, ,,	250 ml	25	17·50	*b*
IH-384	,, ,,	500 ml	20	17·00	*b*

IH-390	**Cover, gabled, stainless steel, covering entire bath. Not airtight ... ...**	Each	**£19·00**	*b*
IH-392	**Cooling coil ... ...**	Each	**£11·50**	*b*
IH-110	**Thermometer, 10–60°C ...**	For details and prices see entries in List No. sequence.		
TJ-440	**Thermometer, 0–110°C ...**			
FJ-050	**Flasks, 50, 100, 250 and 500 ml**			

PERFORMANCE

Temperature range

Without cover	Ambient† to 50°C
With cover	Ambient† to 80°C

(† For operation near or below ambient temperature the cooling coil must be fitted and supplied with cold water).

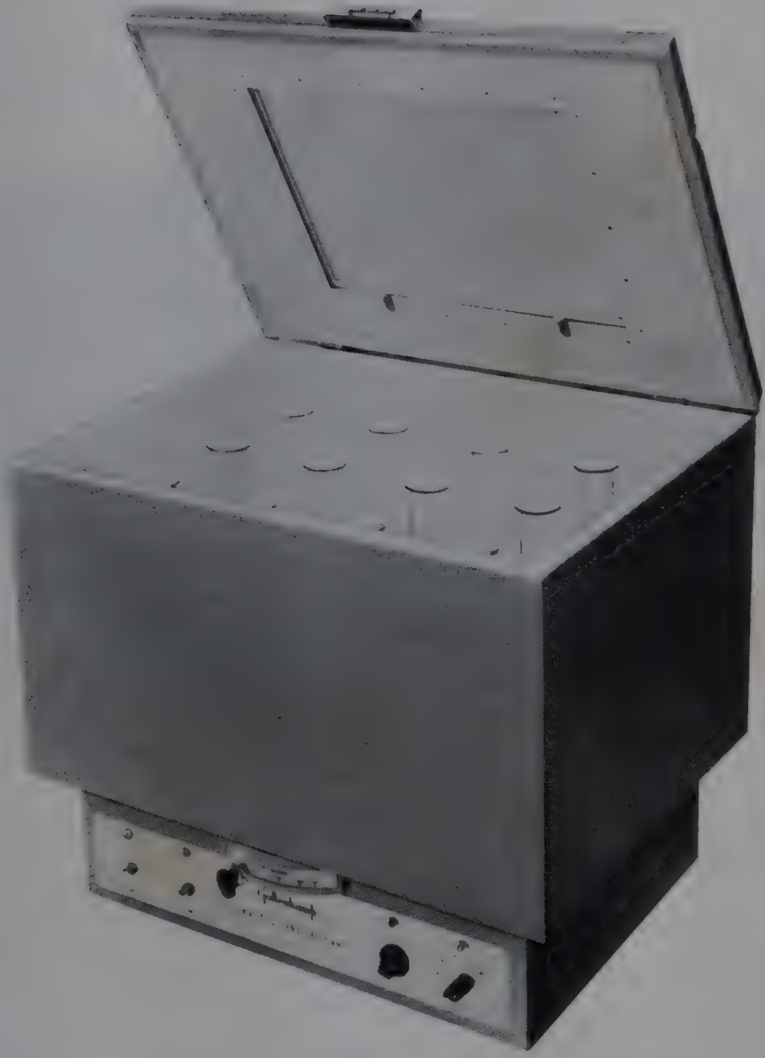
Temperature fluctuation	0·2degC
Stroke lengths	6, 12, 19, 25, 31 or 38 mm
Shaker speed	Variable in ten steps from 20 to 200/min, depending upon stroke length and loading. Load diagram on control panel shows maximum speed for each load and stroke.

DIMENSIONS

		H	W	D
Overall		37 ×	84 ×	56 cm
		14½ ×	33 ×	22 in
Bath interior		28 ×	60 ×	46 cm
		11 ×	24 ×	18 in
Rack size			53 ×	43 cm
			21 ×	17 in
Depth of water above rack	max.	20 cm (8 in)		
	min.	2·5 cm (1 in)		
Power rating, max.		2000W		

Items on this page normally available from stock except those coded *N*.

Gallenkamp ORBITAL



IH-400

PERFORMANCE

Temperature range:	5degC above ambient tp 50°C
Temperature fluctuation of samples:	less than 0·1degC
Temperature variation of samples:	less than 0·5degC
Diameter of orbit:	32 mm
Orbiting speeds:	140–280/min stepless 75–150/min 30 – 60/min
Capacity:	36 × 250 ml conical flasks 28 × 500 ml conical flasks 18 × 1 litre conical flasks 12 × 2 litre conical flasks

DIMENSIONS

	H	W	D	
Overall	71	× 81	× 66	cm
	28	× 32	× 26	in
Internal	35·5	× 76	× 56	cm
	14	× 30	× 22	in
Platform		68·5	× 48	cm
		27	× 19	in
Window		48	× 39·5	cm
		19	× 15½	in
Weight, net	86 kg (190 lb)			
Power rating, max.	750W			

For growing cultures of micro-organisms and tissue cells under controlled conditions of temperature and agitation. Applications in microbiology, botany, zoology, virology, bacteriology, biochemistry and metallurgy. Designed in consultation with Professor S. J. Pirt, Microbiology Department, Queen Elizabeth College, London.

- **Up to 36 samples simultaneously incubated**
- *Compenstat* **control within ±0·5degC**
- **Built-in safety thermostat**
- **Reliable operation over long periods unattended**
- **Stepless speed control**

OPERATION

Shaking action. The platform moves with a circular orbital motion which minimises the accretion of material on the sides of the flasks. The speed of this motion can be regulated in order to control the transfer of oxygen (or other gases) between the gaseous and liquid phases and hence the absorption of these gases. The driving motor is a 1/20 hp brushless induction motor with permanently lubricated bearings.

Temperature. Thermostatic control by *Compenstat* ensures accurate and uniform temperature throughout the incubator. Thermometer clips are fixed to the underside of the incubator lid so that a thermometer when fitted can be read through the window without disturbing the incubator conditions. To protect cultures from overheating as the result of incorrect setting of the *Compenstat* or a fault condition, an adjustable safety thermostat is fitted.

Atmosphere. The incubator is normally used for growth in air but the counterbalanced lid is fitted with a magnetic gasket and a tubulure is inserted in the cabinet wall in order that other atmospheres may be introduced.

CONSTRUCTION

Long term reliability and quite running result from the platform being mounted on accurately aligned double row rigid ball journals. The incubator is heated by an efficient hot air circulating system and the absence of water as a heating medium means that 'topping up' is avoided.

Flasks up to 2 litre capacity may be mounted on the platforms, there being 35 cm clearance between the platform and the cover. The window in the cover is a toughened glass, double glazed, sealed unit which reduces heat losses and positively prevents the view of the interior being obscured by condensed moisture. The inner surfaces of the incubator are finished in resistant, easily cleaned white epoxy enamel.

INCUBATORS

IH-400

INCUBATOR, ORBITAL, *Gallenkamp*, as specification. A circulated heated air incubator with *Compenstat* control, counterbalanced lid with double glazed window and magnetic gasket, orbital drive mechanism giving speed range 140–280/min with stepless speed control and safety thermostat. **Without thermometer. Requires but does not include flask platform.** For 220/240V 50 Hz single phase supplies ... ... Each **£320·00** *b*

IH-402

INCUBATOR, ORBITAL, *Gallenkamp*, as IH-400 but orbiting speed range 75–150/min. **Without thermometer. Requires but does not include flask platform.** For 220/240V 50 Hz single phase supplies.
Each **£330·00** *bN*

IH-404

INCUBATOR, ORBITAL, *Gallenkamp*, as IH-400 but orbiting speed range 30–60/min. **Without thermometer. Requires but does not include flask platform.** For 220/240V 50 Hz single phase supplies.
Each **£335·00** *bN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

Platforms with clips to accept conical flasks:

List No.	For flasks capacity (ml)	Base dia. mm	No. of positions	Each £	
IH-410	250	86	36	20·00	*b*
IH-414	500	101	28	20·00	*b*
IH-418	1000	130	18	20·00	*b*
IH-422	2000	160	12	33·00	*b*

TJ-070 **Thermometer**, range −5 to 50°C in 0·2degC subdivisions. For details and price see entry in List No. sequence.

ORBITAL INCUBATOR WITH INTERIOR ILLUMINATION AND REFRIGERATION

For growing cultures of micro-organisms and tissue cells under controlled conditions of agitation and illumination, at temperatures below or above ambient.

A modified version of the standard Orbital Incubator incorporating interior fluorescent illumination and a refrigeration system.

The interior of the incubator is uniformly illuminated by seven 'daylight' fluorescent tubes mounted on the underside of the hinged lid. A reflector is fitted behind the tubes and a Perspex sheet is positioned between the tubes and the working space. **No window is fitted in the cover** but an air blower is mounted on it to cool the tubes.

The cooling coil fitted below the flask platform support is supplied with refrigerant from a refrigerator which, together with individual switches for each of the fluorescent tubes and the ON/OFF switch for the air blower, is contained in a control box.

TECHNICAL DATA

Power rating of each fluorescent tube	30W
Power rating of refrigerator	1/6 hp
Minimum temperature with illumination	10°C below ambient
Minimum temperature without illumination	20°C below ambient
Maximum temperature	50°C

IH-450

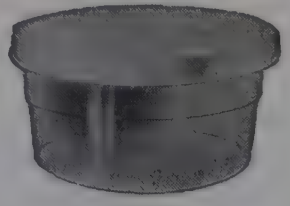
IH-450

INCUBATOR, ORBITAL, ILLUMINATED AND REFRIGERATED, *Gallenkamp*, as IH-400 but including cover fitted with seven fluorescent lamps, reflector, baffle and air blower but **without window.** Includes cooling coil and combined refrigerator and control box. For 220/240V 50 Hz supplies only. **Requires but does not include flask platform** (see IH-410 to IH-422).
Each **£600·00** *b*

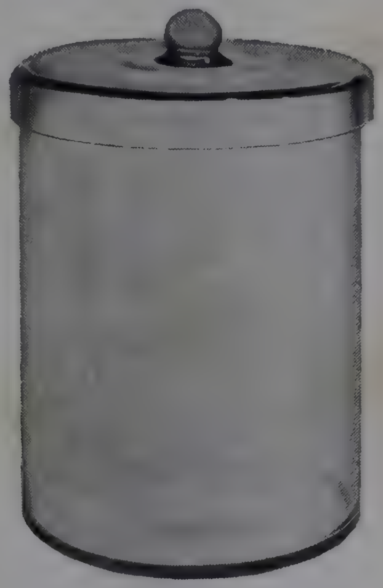
ACCESSORIES see under IH-400 above.

Items on this page normally available from stock except those coded *N*.

JE-100

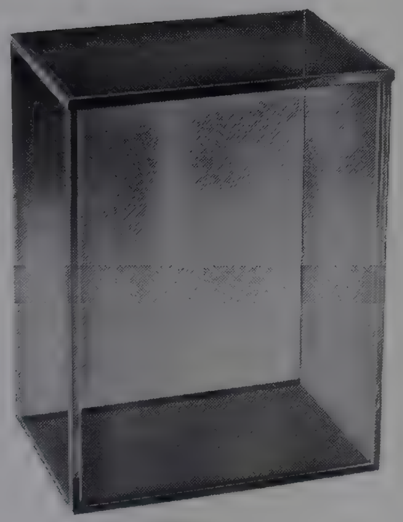


JE-235



JE-440

JE-410



JE-520

JARS

JE-100

JARS, battery, glass, with ground rim.

Capacity approx.	300	900	1200	2000 ml	
Height	125	150	200	225 mm	
Dia.	75	100	100	125 mm	
Ten	**£4·60**	**5·60**	**5·60**	**10·20**	*m*
Each	**£0·51**	**0·62**	**0·62**	**1·14**	

JE-235

JARS, specimen, polystyrene, taper sided with extra wide mouth and airtight, close fitting white polythene lids. In packs of 25.

Capacity	20	35	85	180	280	360 ml	
Height	25	35	35	75	85	110 mm	
Top dia	40	45	68	68	82	82 mm	
10 packs	**£5·30**	**5·80**	**7·20**	**9·00**	**11·20**	**13·00**	*c*
Pack	**£0·59**	**0·64**	**0·80**	**1·00**	**1·25**	**1·45**	

***JE-410**

JARS, specimen, soda-lime glass, with foot and ground-in cover with knob.

Capacity approx.	400	550	750	2800 ml	
Diameter	80	80	80	120 mm	
Height	120	150	200	300 mm	
Ten	**£13·00**	**13·80**	**15·50**	**36·00**	*c*
Each	**£ 1·45**	**1·55**	**1·75**	**4·00**	

JE-440

JAR, specimen, soda-lime glass, 25 cm high, 20 cm dia. with drop-on lid and knob. Capacity approx. 7 litres.
Ten **£20·00** Each **£2·25** *c*

JE-520

JARS, specimen, Perspex, rectangular, polished flat surfaces on all sides. With cover.

Height	5	10	15	17·5 cm	
Width	5	7·5	10	12·5 cm	
Depth	2·5	5	5	10 cm	
Ten	**£3·30**	**5·20**	**7·00**	**13·40**	*m*
Each	**£0·39**	**0·58**	**0·78**	**1·50**	
Height	20	22·5	25	30 cm	
Width	15	15	15	20 cm	
Depth	10	7·5	10	10 cm	
Ten	**£16·00**	**16·00**	**18·00**	**24·00**	*m*
Each	**£ 1·80**	**1·80**	**2·00**	**2·70**	

PP-624

PERSPEX SHEET, suitable for cutting into mounting plates for jars JE-520 see details in List No. sequence.

BT-220
JARS, (Bottles) polythene, extra wide neck.
BT-225
JARS, (Bottles) rigid polythene, extra wide neck, square shape.
BT-265
JARS, (Bottles) glass, extra wide neck.
BT-280
JARS, (Bottles) glass, extra wide neck, square shape.
BT-290
JARS, (Bottles), Kilner.
GD-250
GAS COLLECTING JARS, with ground flange.
HT-500
HYDROMETER TRIAL JARS, glass.
HT-520
HYDROMETER TRIAL JARS, polythene.
For details of above items see entries in List No. sequence.

All items on this page normally available from stock.

INTERCHANGEABLE GLASS JOINTS QUICKFIT AND CLEARFIT

TO BS 572

JR-010
CONE JOINTS, *Quickfit*, plain end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
5/13	4	CNB5	3·10	0·33	*m*
7/16	7	CNB7	2·70	0·29	*m*
10/19	9	CNB10	2·55	0·28	*m*
12/21	12	CNB12	2·55	0·28	*m*
14/23	14	CNB14	2·40	0·27	*m*
19/16	18	CNB19	2·55	0·28	*m*
24/29	23	CNB24	2·90	0·31	*m*
29/32	28	CNB29	3·25	0·34	*m*
34/35	33	CNB34	3·50	0·36	*m*
40/38	39	CNB40	4·45	0·42	*m*
45/40	44	CNB45	5·40	0·51	*m*
50/42	49	CNB50	5·95	0·56	*m*

JR-012
CONE JOINTS, *Clearfit*, plain end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
14/23	14	KCNB14	3·75	0·38	*m*
19/26	18	KCNB19	4·20	0·41	*m*
24/29	23	KCNB24	4·45	0·43	*m*
29/32	28	KCNB29	4·70	0·45	*m*

JR-030
CONE JOINTS, *Quickfit*, angle drip end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
10/19	9	CAB10	3·05	0·32	*m*
14/23	14	CAB14	2·95	0·31	*m*
19/26	18	CAB19	3·15	0·33	*m*
24/29	23	CAB24	3·50	0·36	*m*
29/32	28	CAB29	3·90	0·39	*m*
34/35	33	CAB34	4·30	0·42	*m*

CARE OF GROUND GLASS JOINTS

A thin film of ptfe applied to ground joints by spraying with aerosol provides efficient lubrication.

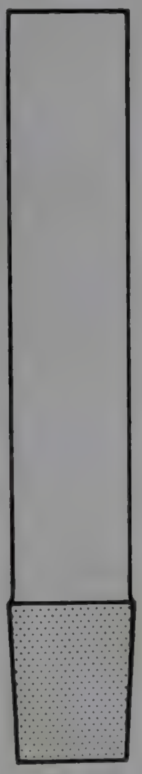
For best results the film should be evenly deposited, and for this purpose the joint should be slowly rotated at steady speed whilst the aerosol is applied.

For a suitable aerosol lubricant see LX-245 in List No. sequence.

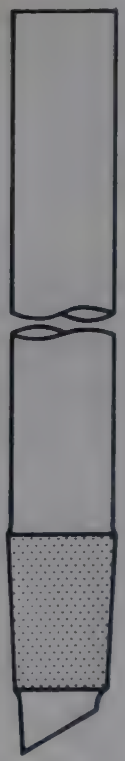
The properties of *Quickfit* ground glass joints are too well known to require introduction.

Clearfit conical glass joints are manufactured by a process which achieves a fine precision fit without the necessity of grinding. This provides the following advantages:

- **Greater strength**
- **Reduced leakage and creep**
- **Less contamination, easier cleaning**
- **Greasing rarely necessary**
- **Reduced seizing or sticking**
- **Reduced alkali attack**
- **Transparent for internal observation**
- **Interchangeable with ground joints**


JR-010

JR-012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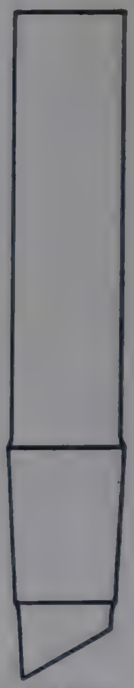
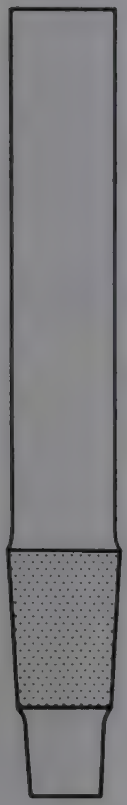

JR-032

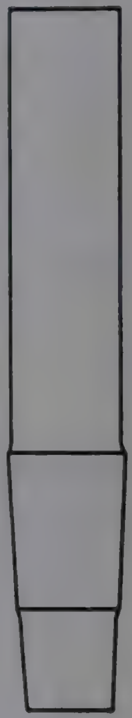
JR-032
CONE JOINTS, *Clearfit*, angle drip end, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
14/23	14	KCAB14	4·30	0·42	*m*
19/26	18	KCAB19	5·15	0·48	*m*
24/29	23	KCAB24	5·40	0·50	*m*
29/32	28	KCAB29	5·65	0·53	*m*

All items on this page normally available from stock.

QUICKFIT AND CLEARFIT JOINTS


JR-035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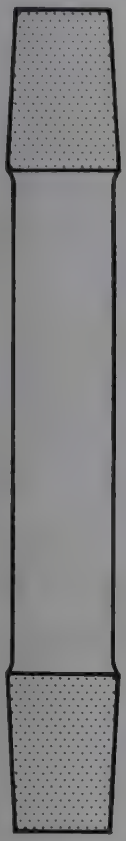
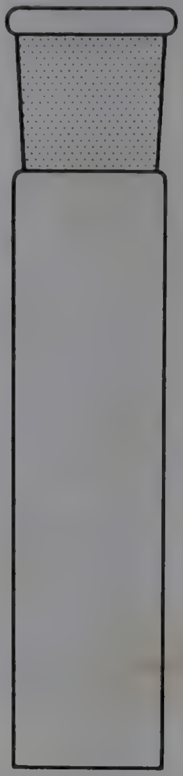
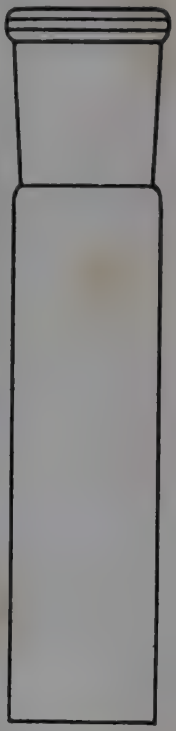

JR-040


JR-080


JR-082

JR-035

CONE JOINTS, *Quickfit*, long tip, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
7/16	7	CBB7	3·35	0·34	m
10/19	9	CBB10	2·95	0·31	m
14/23	14	CBB14	2·55	0·28	m
19/26	18	CBB19	2·85	0·30	m
24/29	23	CBB24	3·10	0·32	m
29/32	28	CBB29	3·35	0·34	m
34/35	33	CBB34	3·65	0·37	m
40/38	39	CBB40	4·60	0·44	m
45/40	44	CBB45	5·65	0·53	m

JR-037

CONE JOINTS, *Clearfit*, long tip, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
14/23	14	KCBB14	4·05	0·40	m
19/26	18	KCBB19	4·70	0·45	m
24/29	23	KCBB24	5·15	0·48	m
29/32	28	KCBB29	5·40	0·50	m

JR-040

CONE JOINTS, *Quickfit*, double cone, plain ends, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
10/19	9	CND0/50	4·60	0·44	m
14/23	14	CND1/80	4·30	0·42	m
19/26	18	CND2/80	4·60	0·44	m
24/29	23	CND3/95	5·15	0·48	m
34/35	33	CND5/150	6·50	0·60	m

JR-080

SOCKET JOINTS, *Quickfit*, with shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
5/13	6	SBB5	4·70	0·45	m
7/16	7	SBB7	5·15	0·48	m
7/16	11	SRB7	3·50	0·36	m
10/19	14	SRB10	2·85	0·30	m
12/21	15	SRB12	2·85	0·30	m
14/23	18	SRB14	2·55	0·28	m
19/26	23	SRB19	2·55	0·28	m
24/29	28	SRB24	2·85	0·30	m
29/32	33	SRB29	3·35	0·34	m
34/35	40	SRB34	3·90	0·39	m
40/38	46	SRB40	4·60	0·44	m
45/40	52	SRB45	5·65	0·53	m
50/42	56	SRB50	6·50	0·60	m

JR-082

SOCKET JOINTS, *Clearfit*, plain shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube dia., mm	Ref. No.	Dozen	Each	
			£	£	
14/23	18	KSRB14	3·75	0·37	m
19/26	23	KSRB19	4·05	0·40	m
24/29	28	KSRB24	4·45	0·43	m
29/32	33	KSRB29	4·70	0·45	m

All items on this page normally available from stock.

QUICKFIT JOINTS

JOINT SPRINGS

JR-140
SPRINGS, for use on joints with hooks. In packs of 12.

Ref. No.	MF40	MF40A	MF40B	
Length	25	38	50 mm	
For joints from	7/16	14/23	40/38	
to	12/21	34/35	55/44	
10 packs	**£2·00**	**2·50**	**4·10**	*m*
Pack	**£0·26**	**0·31**	**0·47**	

FLAT FLANGE JOINTS

JR-180
FLAT FLANGE JOINTS, *Quickfit*, interchangeable borosilicate glass, for high vacuum work.

Nominal bore, mm	Approx. flange dia., mm	Ref. No.	Six	Each	
			£	£	
15	45	FG15	**5·13**	**0·95**	*m*
25	55	FG25	**5·95**	**1·10**	*m*
35	75	FG35	**7·55**	**1·40**	*m*
50	85	FG50	**10·00**	**1·85**	*m*

SPHERICAL JOINTS

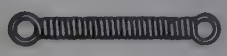
TO BS 2761

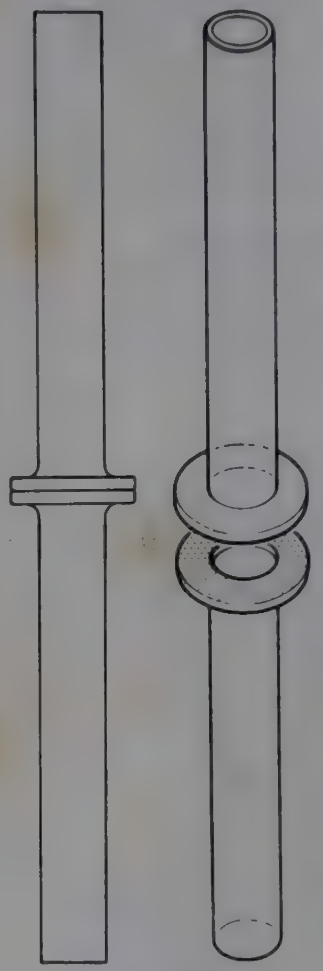
JR-250
BALL JOINTS, *Quickfit*, borosilicate glass, interchangeable inner portions of spherical joints, designed to avoid rigidity rather than to allow appreciable deflection.

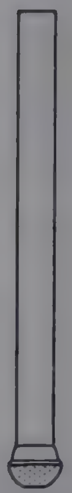
Nominal bore, mm	Ref. No.	Dozen	Each	
		£	£	
2	MS13C	**4·60**	**0·44**	*m*
5	MS13	**4·60**	**0·44**	*m*
9	MS19	**5·00**	**0·47**	*m*
15	MS29	**6·75**	**0·62**	*m*
21	MS35	**7·85**	**0·74**	*m*
27	MS41	**8·65**	**0·80**	*m*

JR-255
CUP JOINTS, *Quickfit*, borosilicate glass, interchangeable outer portions of spherical joints.

Nominal bore, mm	Ref. No.	Dozen	Each	
		£	£	
2	FS13C	**5·25**	**0·49**	*m*
5	FS13	**5·25**	**0·49**	*m*
9	FS19	**5·65**	**0·53**	*m*
15	FS29	**6·75**	**0·62**	*m*
21	FS35	**7·85**	**0·74**	*m*
27	FS41	**8·90**	**0·84**	*m*


JR-140


2 Joints FG15
JR-180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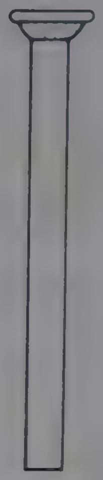
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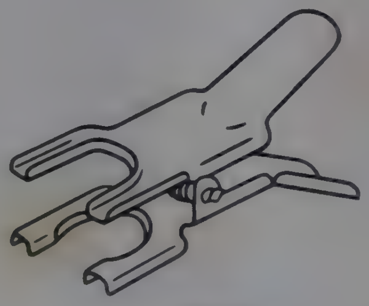

JR-260
Ref. Nos. JC13 to JC50F
JC75F and JC100F are made of stainless steel wire.

JOINT CLIPS

JR-260
JOINT CLIPS, *Quickfit*, for holding flat flanges and spherical joints.

To fit ball and cup joint Size No.	To fit flat flange. Nominal bore mm	Ref. No.	Dozen	Each	
			£	£	
S13	2	JC13	**2·55**	**0·28**	*m*
S19	5	JC19	**3·10**	**0·33**	*m*
S29	10	JC29	**3·10**	**0·33**	*m*
S35	15	JC35	**3·80**	**0·38**	*m*
S41	25	JC41	**4·20**	**0·41**	*m*
S51	—	JC51	**5·40**	**0·50**	*m*
—	50	JC50F	**8·10**	**0·76**	*m*
—	75	JC75F	**8·65**	**0·80**	*m*
—	100	JC100F	**8·65**	**0·80**	*m*

All items on this page normally available from stock.

JV-100

JV-150

MEASURES, Board of Trade stamped see MEASURES

MEASURING CYLINDERS see CYLINDERS

JV-250

JUGS

JV-100

JUGS, enamelled steel, cylindrical, with handle and spout, graduated inside in cc, pt, and fl. oz.

Capacity	½	1	2	5 litre	
Each	£0·65	0·90	1·30	2·65	c

***JV-150**

JUGS, stainless steel, tapered, with handle and spout, graduated inside in litres and decilitres.

Capacity	½	1	2 litres	
Each	£0·80	1·30	1·80	m

JV-250

JUGS, rigid polypropylene, with spout and handle, graduated in pints, fl. oz., litres and decilitres.

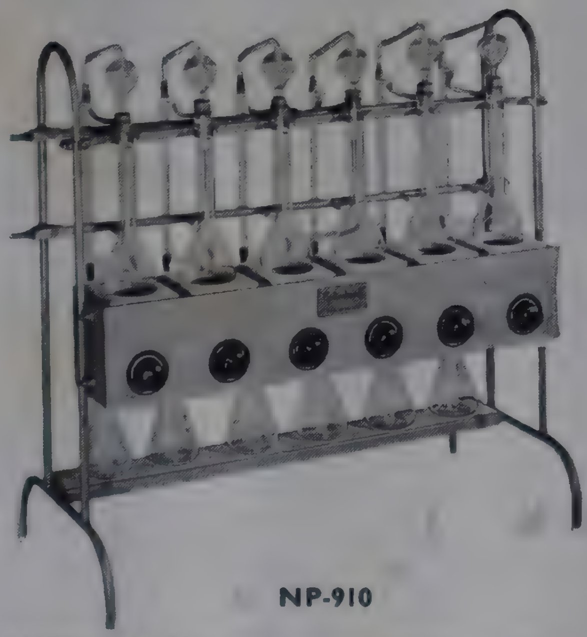
Capacity	½	1 litre	
Ten	£2·60	3·90	c
Each	£0·32	0·44	

KARL FISCHER APPARATUS
see ELECTROCHEMICAL ANALYSIS

KILNER JARS see BOTTLES

KIPPS APPARATUS
see GAS GENERATORS

KNIVES,
- **Cartilage** see DISSECTING
- **Cork cutting** see TOOLS
- **Glass cutting** see GLASSBLOWING TOOLS
- **Microtome** see MICROTOMES
- **Palette** see SPATULAS



NP-910

MACRO ASSEMBLY FOR DISTILLATION

Gallenkamp
REGD TRADE MARK

KJELDAHL EQUIPMENT

For the determination of nitrogen by the Kjeldahl method

MACRO and MICRO ASSEMBLIES

available for digestion and distillation with heating by either electricity or gas.

Full range of fume extraction equipment available.

For full details and prices of the *Gallenkamp* range see entries under page heading **Nitrogen Determination.**

All items on this page normally available from stock.

LABELS

LB-120

LABELS, blank, self-adhesive white, in special boxes which dispense one label at a time. These labels adhere securely to most materials including plastics.

Size	12·5×24	23·5×49	25×63	25×75 mm	
Quantity	1000	500	500	500	
10 boxes	**£5·00**	**5·30**	**12·00**	**13·00**	c
Box	**£0·56**	**0·59**	**1·35**	**1·45**	

LB-130

LABELS, blank, self-adhesive white, set out on sheets so that titles may be conveniently typed onto the labels. The labels adhere securely to most materials including plastics. Size 19×24·5 mm is suitable for use on microscope slides.

Size	19×24·5	19×63	35×44·5 mm	
Qty. in box	1000	500	500	
10 boxes	**£6·80**	**5·60**	**6·60**	c
Box	**£0·76**	**0·62**	**0·74**	

HJ-833

LABELS for microscope slides. For details and price see entry in List No. sequence.

LB-135

LABEL, blank, self-adhesive, white, 8 mm diameter circular, set out on sheet of 140. In box of 25 sheets.

Box **£1·45** c

LB-140

LABELLING TAPE, cellulose, opaque, self-adhesive with special white surface for writing on. In rolls of 65 metres.

Tape width	19	25 mm	
10 rolls	**£6·60**	**8·60**	m
Roll	**£0·74**	**0·96**	

LB-150

LABELS, 'STERILE'. Self-adhesive PVC labelling tape with word 'STERILE' printed in blue on white ground. Size 50×12·5 mm wide, in 65 metre rolls.

10 rolls **£6·20** Roll **£0·68** m

LB-155

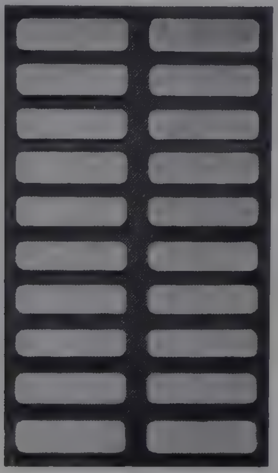
LABELS, 'POISON'. Self-adhesive PVC labelling tape with word 'POISON' printed in red on white ground. Size 50×12·5 mm wide, in 65 metre rolls.

10 rolls **£6·20** Roll **£0·68** m

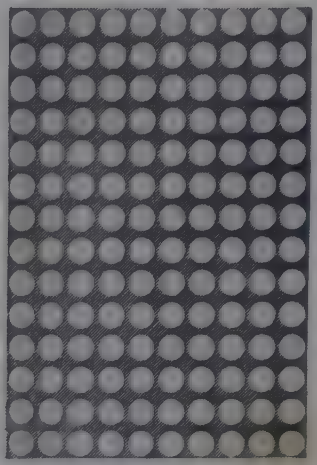
LB-160

WARNING TAPE, self-adhesive, PVC, legend 'DANGER—RADIOACTIVE MATERIAL' with international radioactivity symbol in yellow and red. Size 70×25 mm, in 65 metre rolls.

10 rolls **£9·60** Roll **£1·06** c



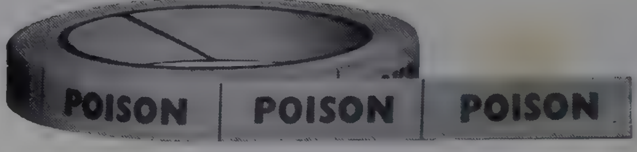
LB-130



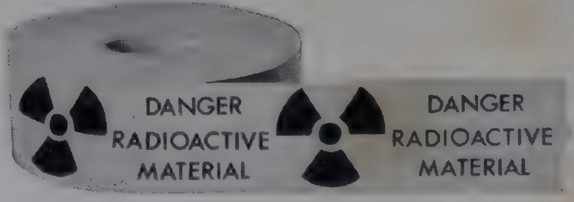
LB-135

STERILE
STERILE
STERILE

LB-150



LB-155



LB-160

LABELLED REAGENT BOTTLES see BT-400 et. seq
LABELLING PENCILS see PC-910 et. seq

ETCHING INK see GR-200
GLASS WRITING DIAMONDS see GP-210 et. seq

All items on this page normally available from stock.

LAMPS

LH-250

LH-300

***LH-250**

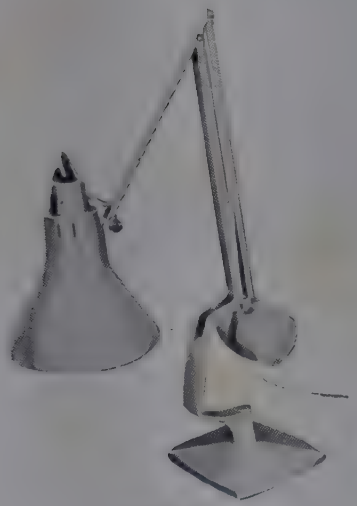
LAMP, low voltage, extending arm. A compact adjustable wall or bench lamp with 12V, 21W bulb. A heavy base houses a mains transformer and OFF/DIM/BRIGHT switch and confers stability to the lamp even when the 40 cm telescopic arm is extended. Dimensions 17×7×6·5 cm when closed. For 220/240V a.c. single phase supplies only ... ... Each **£6·00** *m*

REPLACEMENT PART

LH-252 Bulb, 12V, 21W ... Ten **£2·80** Each **£0·34** *c*

LH-300

LAMP, *Anglepoise*, giving concentrated light at any angle. With 75 cm long arm, adjustable to any position, and table base. For use with 40W B.C. fitting bulb. **Without bulb** ... ... Each **£8·40** *m*



LH-305

LH-330

LH-305

LAMP, counterpoised, of sturdy design for desk or bench use, giving concentrated light at any angle. A 60 cm reach, with rolling weight counterpoised action giving perfect adjustment even on a sloping surface. With table base. For use with 40 to 100W B.C. fitting bulb. **Without bulb** ... ... Each **£6·97** *m*

LH-330

LAMP, fluorescent, for bench mounting. With two 30 cm tubes in reflector housing fully adjustable in all directions. Flexible 'stayput' arm mounted on control unit and heavy base. Consumption 20W with light output equivalent to 75W tungsten lamp. Finished stove enamel and chromium plate. For 230/250V a.c. supplies. Each **£11·45** *m*

Models for 100/115 and 200/220V available to special order.

REPLACEMENT PART

LH-332 Fluorescent tube ... ... Each **£0·45** *m*

MA-845

ILLUMINATED MAGNIFIER, *Anglepoise*, with 25W lamp and 11×8 cm lens. For details and price see entry in List No. sequence.

MA-854

ILLUMINATED MAGNIFIER, wide angle, with two fluorescent tubes and 16·5×10 cm lens. For details and price see entry in List No. sequence.

MICROSCOPE LAMPS

ML-802 et. seq *Olympus* range

MP-825 et. seq *Prior* range

For details and prices see entries in List No. sequence.

All items on this page normally available from stock.

FIBRE OPTICS

- **High intensity 'cold' illumination for microscopy and biological purposes**
- **Remote monitoring of lamps**
- **Liquid or solid level monitoring**
- **Illumination in equipment where heating causes intolerable inaccuracies or drift**
- **Flame monitoring**
- **Inspection of assemblies**

'Fibre optics' is the term used to describe a development in optical engineering which enables light to be transmitted along fibres. The fibres, which can be of glass or plastics, are sufficiently flexible to be bent into intricate forms. Glass fibres have cores of optical glass sheathed in a glass of different refractive index. Light entering one end of a fibre is contained by and transmitted along the fibre by total internal reflection within the core. Fibres are normally used grouped into bundles and protected by a flexible sheath. If the grouping is random the bundles are known as light guides and are suitable only for transmitting light incoherently; if the grouping is coherent each fibre remains in the same juxtaposition with its neighbours along its entire length and images can be transmitted. Thus both light and images can be transmitted in other than straight lines, and remote or inaccessible subjects can be viewed. Emergent light is often cooler than the incident light at source, which explains why fibre optics are often referred to as providing 'cold' illumination.

TECHNICAL DETAILS OF GLASS FIBRE BUNDLES

Operating temperature range	−40 to 150°C
Fibre diameters	0·043 to 0·066 mm
Incident light acceptance angle, approx.	66°
Numerical aperture in air, approx.	0·54
Typical transmission of light through;	
single fibre, 1 metre long	70%
bundle, 1 metre long	40%

LOW-POWER ILLUMINATOR

A pocket device which enables light to be concentrated on very small areas without the use of complex lens systems. It comprises a battery powered torch with lens tipped bulb and a connector which accepts the 30 cm incoherent fibre optical light guide.

HIGH-POWER ILLUMINATOR

A mains operated source of high intensity light which emerges from the light guides at low temperature. A blower-cooled 150 watt projector lamp with dichroic reflector provides brilliant illumination at the light guide socket. This socket, which is standard ACMI size, is set in a disk on the front panel. In the event of a lamp failure the disk is rotated to bring a standby lamp into operation.

A rotary switch on the front panel can be set to any of five different illumination intensities. Also on the front panel are a mains ON/OFF switch and indicator lamp.

Lamp changing is a simple operation. A fuse with spare cartridge is provided.

A 90 cm flexible light guide with an ACMI plug on one end and a 3 mm ferrule on the other is included with the illuminator.

Available as an accessory is a Y-guide which divides the input to its plug into two outputs. These, by means of plastics couplers can be connected to the two 45 cm light guides or to any other light guides with 3 mm ferrules.

FIBROSCOPE

A complete remote viewing instrument comprising a viewing head with focusing eyepiece, a coherent fibre bundle and a transmitting light guide in a flexible armoured metal sheath, a focusing objective and the mains operated high power illuminator described above. Light from the illuminator passes down the light guide to illuminate the subject. Reflected light from the subject returns through the coherent fibre bundle and forms an image at the eyepiece. A right angle objective attachment is provided.

Technical data

Focusing range of objective	3·3 mm to ∞
Eyepiece magnification	×6
Image resolution	15 line pairs/mm

LH-380

LH-365

LOW-POWER ILLUMINATOR, as specification, comprising battery light source and flexible transmitting light guide ... ... Each **£3·50** *mS*

LH-370

HIGH-POWER ILLUMINATOR, as specification, comprising light source with 90 cm transmitting light guide and two lamps. For 200/250V 50/60 Hz single phase supplies ... ... Each **£52·70** *m*

ACCESSORY

LH-372 **'Y' Guide outfit,** as specification, comprising 'Y' guide and two 45 cm light guides ... ... Each **£15·80** *m*

LH-380

FIBROSCOPE, as specification, comprising high-power illuminator, flexible illuminating/viewing guide, viewing head and straight and right angle objective attachments. For 200/250V 50/60 Hz single phase supplies. Each **£245·00** *m*

Items on this page coded *S* **normally available from stock.**

Gallenkamp DISCHARGE LAMPS

SODIUM LAMP

LH-400

SODIUM LAMP, *Gallenkamp.* A robust, brilliant source suitable for spectroscopy, polarimetry, refractometry and interferometry. Comprises a 45W sodium discharge tube, housed in a metal shield with a 2·5 cm dia. aperture and mounted by means of a bosshead on the alloy rod at the rear of the control box. The transformer and ON/OFF switch are mounted within the control box which provides a stable base for the assembly.

For 200/250V a.c. supplies ... ... Each **£26·00** *b*

REPLACEMENT PART

LH-402 Sodium discharge tube, 45W... ... Each £3·25 *m*

LH-400

ULTRAVIOLET LAMP FOR 365 nm

The 125W mercury discharge bulb is enclosed in an ultraviolet glass filter from which there is practically no visible light, 95% of the radiation being at 365 nm. The assembly is housed in an anodised aluminium reflector, mounted on an easily adjustable arm. The arm is pivoted from a metal case which houses a multitapped choke, making the whole a self-contained and portable unit. A carrying handle is fitted to the top of the case. External finishes are stoved enamel and chromium plate. The lamp is normally supplied with a voltage range of 200/250V 50 Hz only. Voltage tappings are provided in 10V steps, **and the exact supply voltage should be stated when ordering,** so that the equipment can be supplied in correct adjustment.

NOTE: 1 nm≡10Å

LH-530

LAMP, ultraviolet, *Gallenkamp*, portable, as specification, with peak output at 365 nm. Consisting of 125W bulb, filter, reflector and adjustable arm mounted on power unit. For 200/250V 50 Hz supplies.

Each **£47·00** *b*

REPLACEMENT PART

LH-532 Spare bulb, 125W ... ... Each £5·00 *m*

When ordering please state exact voltage and frequency of supply.

LH-530

PHOTOCHEMICAL REACTOR

For small scale photochemical research using UV radiation

- **Incorporates medium pressure, 100W mercury lamp**
- **Flask capacity 1000 ml**

For details and price see PK-100 in List No. sequence.

All items on this page normally available from stock.

ULTRAVIOLET LAMPS FOR MISCELLANEOUS WAVELENGTHS

LH-535

LAMP, ultraviolet. With two 23 cm low pressure fluorescent tubes in reflector housing with Woods glass UV filter. Peak output at 365 nm. Adjustable in all directions by flexible 'stayput' arm mounted on control unit with heavy 18 cm base. Consumption 20W. Finished stove enamel and chromium plate. For 220/250V 50 Hz supplies ... ... Each **£18·00** *f*

REPLACEMENT PART

LH-536 Spare fluorescent tube ... ... Each £0·65 *m*

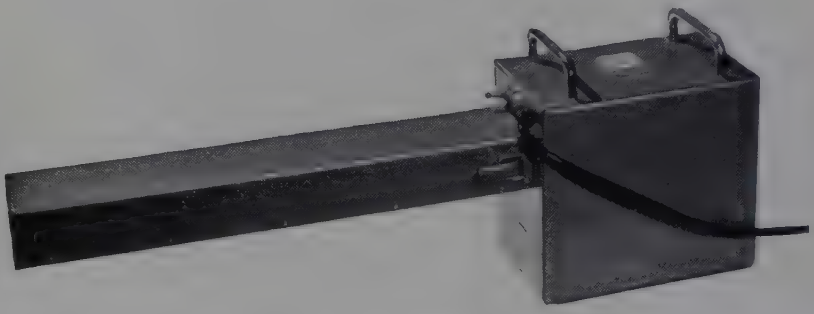
LH-535

LH-540

LAMP, ultraviolet, *Hanovia 'Chromatolite'*, 90% of the output of which is at 237 nm wavelength. The quartz envelope of the cold cathode discharge tube is bent into a 30 cm long U-form and is mounted in a metal box housing, one side of which incorporates the fluorescence filters. The lamp housing is clipped to one face of the power unit which may be stood on any of the other five faces for irradiation of horizontal or vertical planes or for trans-illumination. In the position illustrated, the lamp box clears the bench by 10 cm. Net weight 6 kg. Power consumption 45W. Lamp life averages about 3000 hours without significant loss of output. For 200/250V 50/60 Hz supplies ... ... Each **£53·00** *m*

REPLACEMENT PART

LH-542 Spare tube ... ... Each £15·25 *f*



LH-540

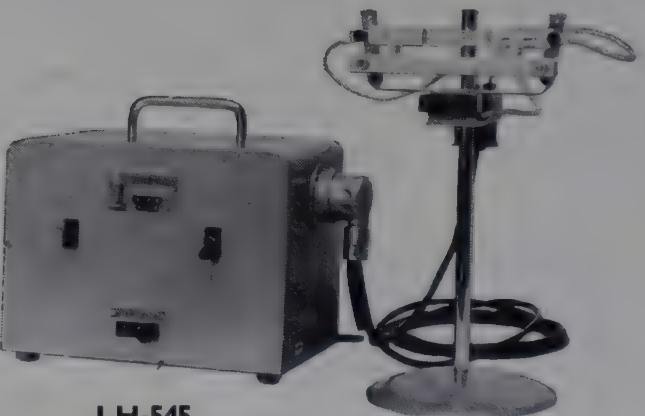
Note: 1 nm≡10Å

LH-545

LAMP, ultraviolet, *Hanovia* UVS/100, incorporating a medium pressure mercury straight arc tube in quartz with an effective length of 44 mm. The principal radiation output is at 365, 302·1, 297·2, 265 and 253·7 nm. Normal effective life is 1000 hours. Power consumption 90W. The tube is mounted on a metal backplate fixed to an upright metal stand, with control unit. For 200/250V 50 Hz supplies ... ... Each **£40·00** *fN*

REPLACEMENT PART

LH-546 Discharge tube, straight, in quartz ... Each £9·50 *fN*



LH-545

HIGH INTENSITY ULTRAVIOLET SOURCE

The system comprises an optical chamber with 100W mercury lamp, reflector, filters and quartz lens and a cased power pack. It produces a high intensity beam of 10 mm dia. at a distance of either 120 mm or 300 mm depending upon the lens selected. Production of ozone by short wavelength UV is obviated by nitrogen flushing and removal of excess heat is by means of a water-cooled jacket.

Radiation intensity varies from about 1·9 to 9·2 mW/cm² over the range 254 to 436 nm using 5 nm half-band width interference filters.

The very high intensity beam has applications in ESR spectroscopy, photochemical studies, fluorimetry, fluorescence microscopy and a number of other applications.

The mercury compact arc lamp has an average life of about 300 hours with an intensity decrease of about 1% per 10 hours running.

LH-560

ULTRAVIOLET SOURCE, high intensity, *Hanovia* UV-100, as specification, comprising optical chamber with mirror and 120 mm focus lens, filter housing with provision for 10 mm liquid filter, 100W mercury arc lamp, six filters (Chance 0×1 and 0×7, two fused quartz and two borosilicate glass) and power pack for 200/250V 50 Hz single phase supplies ... ... Each **£240·00** *fN*

Also available with 300 mm focus lens and for 110V 60 Hz supplies.

LH-560

Items on this page normally available from stock except those coded *N*.

VARIABLE SOURCE SPECTRUM OUTFIT

LH-580 with discharge tube

Comprises a basic stand and power supply transformer box for a range of gas-filled discharge tubes each of which emits light at a number of known wavelengths.

APPLICATIONS

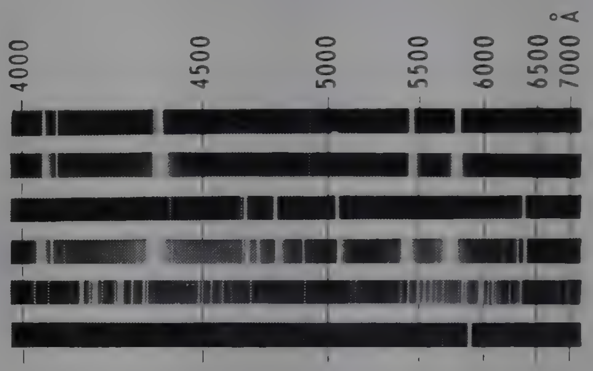
- Interferometry.
- Polarimetry.
- Refractometry.
- Spectroscopy.

LH-580

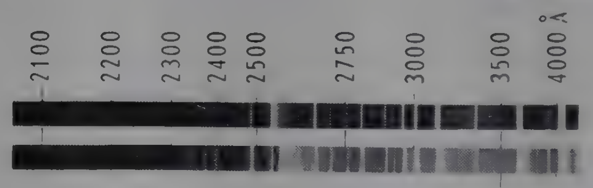
STAND/POWER SUPPLY ASSEMBLY, comprising discharge tube holder and shield mounted on an adjustable stand and a separate transformer box with ON/OFF switch. Suitable for use with but **not including discharge tubes LH-582 to LH-592 listed below.** For 200/250V 50 Hz single phase supplies ... Each **£29·95** *m*

SPECTRAL DISCHARGE TUBES

FOR VISIBLE SPECTRA Tubes with glass envelopes.

List No.	Gas or vapour	Wattage	Arc length mm		Each	
					£	
* LH-582	Hg (low pressure)	15	40		8·80	m
* LH-583	Hg (high pressure)	90	30		11·00	m
* LH-584	Cd	25	30		11·00	m
* LH-585	Hg, Cd, Zn	90	30		11·00	m
* LH-586	A	15	40		7·80	m
* LH-587	Na	15	40		8·80	m

FOR ULTRAVIOLET SPECTRA Tubes with quartz envelopes.

List No.	Gas or vapour	Wattage	Arc length mm		Each	
					£	
* LH-591	Hg (low pressure)	15	40		18·00	m
* LH-592	Hg (high pressure)	90	30		18·00	m

CHROMATOGRAM VIEWING CABINET

LH-600

LH-600

VIEWING CABINET, *Hanovia*, suitable for viewing thin layer and paper chromatograms by transmitted light with the advantage that areas may be measured or traced directly without casting shadows. Incorporates a tungsten lamp and two powerful ultra-violet sources giving very even illumination without shadow. Two sliding filters transmit mainly at 254 nm and 366 nm respectively and a sliding shutter is provided for use when contact printing. The viewing aperture is adjustable at 20×20 cm and 20×5 cm and the top is fitted with guide rails to accept 100×20 cm preparative layer chromatograms. Provision is made for viewing by reflected light when necessary and a camera support rod is provided.

Overall dimensions 30×30×56 cm high. For 200/250V 50 Hz single phase supplies ... ... Each **£175.00** *f*

D.C. EXCITED GAS LASERS

Compact, reliable sources for use as scientific tools in research and industrial applications, and as an apparatus suitable for educational use. The SL series, intended principally for research and industrial applications consists of a laser and separate power pack; the GP series has an integral power pack.

Discharge tube

The discharge tube is of the Brewster window design and comprises a capillary tube surrounded by a coaxial reservoir of borosilicate glass which houses the cathode and anode assemblies. The gas filling is a high purity 5 : 1 ratio helium-neon mixture at a total pressure optimised for operation at 632·8 nm.

Mirrors

Mirrors are of fused silica, with high reflectivity coatings.

Housing

The discharge tube and mirrors are housed in a box structure designed for maximum rigidity and resistance to microphony. To ensure long trouble free life, the spaces between the Brewster windows and the mirrors are sealed under clean conditions.

Output

The output beam is plane polarised and diffraction limited having a diameter at the exit of 1·0 mm. The beam divergence is 0·77 m radian.

Modulation

A socket is provided on each unit to permit amplitude modulation to be applied to the output beam.

Excitation

Excitation at 2 kV (maximum) is provided by the power pack. The dissipation in the discharge tube is normally 15W.

GAS LASERS, d.c. excited, *Ferranti*. **Output at 632·8 nm.** Supplied with operating handbook and, in the case of Models GP1 and GP2, with a handbook of suitable experiments for educational laboratories. For 220/240V 50 Hz single phase supplies.

NOTE: 1 nm≡10Å

List No.	Model	Output Power Uniphase—mW (min)	Weight	Each £	
LK-101	GP1	0·25	5·2 kg	**149·00**	*fN*
LK-102	GP2	1·5		**149·00**	*fN*
LK-103	SL3	0·5	Laser—3 kg Power pack—9 kg	**260·00**	*fN*
LK-104	SL4	1·5		**290·00**	*fN*
LK-105	SL5	2·0		**320·00**	*fN*

Available for other voltages and frequencies to special order.

LK-103 to LK-105

LIQUID DISPENSERS

Various types of apparatus suitable for dispensing liquids will be found under the following headings:

BOTTLES BT-540 to BT-580

CARBOY ACCESSORIES CC-932 to CC-945

PIPETTES PM-664 to PM-765

SYRINGES SY-410 to SY-430

BURETTES BW-334, BW-554

MEDICAL SCIENCES ME-230, ME-244

WATER & CHEMICAL PUMPS WM-200 to WM-260

LIGHTERS

LV-020

LIGHTER, GAS, battery operated, complete with battery and burner element. Suitable for towns (coal) gas and natural (methane) gas ... ... Each **£0·86** *m*

REPLACEMENT PARTS

LV-022	**Battery, 1·5V. Type U14**			Each	**£0·16**	*m*
LV-024	**Burner element...**	Ten	**£1·12**	Each	**£0·18**	*m*

LV-030

LIGHTER, GAS, flint operated. Suitable for all fuel gases ... ... Ten **£8·00** Each **£0·88** *m*

LV-032	**Flints for above.**	Pack of 12. 10 packs	**£0·76**	Pack	**£0·15**	*m*

LV-020

LV-030

Items on this page normally available from stock except those coded *N*.

LUBRICATING OILS AND GREASES

LX-100

LUBRICANT, oil, SAE 5W (approx.), an extra light grade machine oil, containing a corrosion inhibitor. In sealed 4 fl oz (113 ml) can with flexible spout.
Ten **£1·00** Each **£0·17** *m*

LX-110

LUBRICANT, oil, SAE 10, a light grade oil suitable for lubricating sintered bronze bearings on small electric motors, etc. In can with spout, containing 10 fl. oz. (284 ml) ... ... Ten **£2·10** Each **£0·27** c

LX-120

LUBRICANT, oil, SAE 10, *Edwards* No. 8A, a straight mineral oil, recommended for rotary vacuum pumps without air ballast. In can of 1 gallon (4·5 l).
Each **£1·00** *f*

LX-130

LUBRICANT, oil, SAE 20, *Edwards* No. 15, a light/medium grade oil containing multi-functional additives for general use in air ballast pumps, except in the quiet running models. In can of 1 gallon (4·5 l).
Each **£1·00** *f*

LX-140

LUBRICANT, oil, SAE 30, *Edwards* No. 16, a medium grade oil, containing multi-functional additives, for quiet running pumps. In can of 1 gallon (4·5 l). Each **£1·00** *f*

LX-205

LUBRICANT, *Kilopoise* **medium,** a lubricant of extremely high viscosity at room temperature i.e. 1·8 kilopoise. It may be used to give smooth and easy motion to components such as oculars, focusing and adjusting screws, variable condensers, potentiometers and needle valves and has many other instrument applications. It acts as a corrosion inhibitor and sealing agent for both screw and plane contacts. In 1 oz (28 g) tube.
Ten **£1·70** Each **£0·24** *f*

LX-208

LUBRICANT, anti-scuffing, a most useful dry lubricant consisting of a paste containing molybdenum disulphide. It may be applied to metal, plastics or fabric surfaces by rubbing with the finger, pad or brush. No special degreasing is necessary. It provides dry lubrication for all types of mechanisms. In 2 oz (56 g) tube.
Ten **£5·10** Each **£0·56** *f*

LUBRICATION OF BURETTE STOPCOCKS

Stopcocks on burettes or other items of volumetric glassware should NEVER be lubricated with a SILICONE grease. Silicone contamination by 'migration' distorts the shape of the meniscus, alters the amount of drainage and thus DESTROYS ACCURACY. Such contamination is very difficult to remove.

A rubber grease such as LX-210 is specially suitable for lubrication of stopcocks on volumetric glassware.

LUBRICATING GREASES FOR GLASS APPARATUS

LX-210

LUBRICANT, rubber grease, soft, for general lubrication of stopcocks. In 2 oz (56 g) tin.
Ten **£1·80** Each **£0·24** c

LX-220

LUBRICANT, rubber grease, medium, for vacuum stopcocks, desiccators, etc. In 2 oz (56 g) tin.
Ten **£1·80** Each **£0·24** c

LX-235

LUBRICANT, silicone grease. Highly resistant to chemicals, particularly alkali reagents, with great stability over a wide temperature range (−40 to 200°C). Practically colourless and non-poisonous. Suitable for high vacuum purposes and as a stopcock lubricant. Must not be used for volumetric glassware because silicone contamination distorts the shape of the meniscus and alters drainage allowances thus reducing accuracy. In 50 g tube.
Ten **£5·90** Each **£0·66** c

LX-245

LUBRICANT, ptfe aerosol. A dry film lubricant and anti-stick agent. It is an aerosol-dispensed dispersion of ptfe to which a non-toxic film-bonding agent has been added.

Lubrication.—Very low coefficient of friction over wide temperature range. Excellent lubricant for ground glass joints, glass or metal stopcocks.

Anti-stick uses.—Being chemically inert, insoluble and thermally stable up to 275°C, the lubricant is a useful anti-stick agent for glass joints.

In aerosol can containing 13¾ oz (390 g). Each **£1·00** c

Vacuum greases for use in high vacuum work see VB-880 et. seq in List No. sequence.

LUBRICANTS FOR ELECTRICAL CONTACTS

ELECTROLUBE is a chemically inert, water repellent, mechanical lubricant which has also a very low electrical resistance. It will clean and lubricate electrical contacts, switches, relays, potentiometers, sliding rheostats, motor commutators, etc.

It also acts as an arc and tarnish inhibitor and protects against atmospheric humidity. Can be used over a wide range of temperature (−45 to +200°C).

LX-260

ELECTROLUBE, electrical lubricant No. 1 for general laboratory purposes on low current, non-arcing contacts. In pocket dispenser with flexible capillary applicator ... ... Each **£0·65** *m*

LX-263

ELECTROLUBE, electrical lubricant No. 2 for high current, arcing contacts. In 'snorkel' bottle of approx. 2 oz (56 g) ... ... Each **£2·00** *m*

LX-265

ELECTROLUBE, electrical lubricant No 2A-X for extensive application and waterproofing of high tension systems and is harmless to polystyrene, PVC, natural and synthetic rubbers. Aerosol in spray can containing 6 oz (170 g) ... ... Each **£1·05** *m*

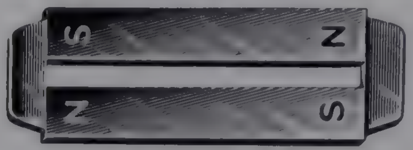
All items on this page normally available from stock.

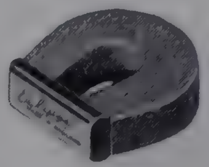
MAGNETS

MA-505

MAGNETS, bar, strongly magnetised tungsten steel, with keepers.

Length	10	15 cm	
10 pairs	**£3·90**	**5·60**	*c*
Pair	**£0·44**	**0·62**	


MA-505

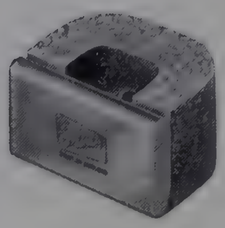

MA-510

MA-510

MAGNET, pocket, '*Alnico*,' with keeper. Contact pull 2·4 kg. Overall height 25 mm, distance between poles 6·3 mm ... ... Ten **£2·25** Each **£0·29** *m*

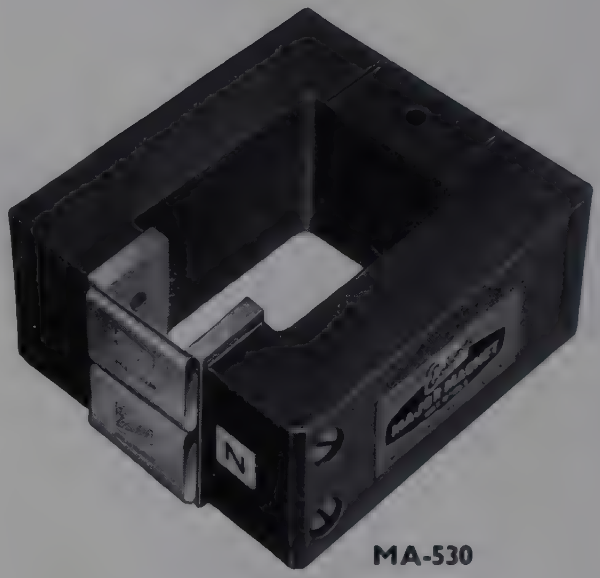
MA-520

MAGNET, in '*Alcomax*', having greater magnetic field strength than tungsten steel permanent magnets. The magnet can be used for handling, lifting and sorting small ferrous parts, work-holding, and as the main component of electrical relays and magnetic filters. Overall height 29 mm, distance between poles 19 mm, contact pull 14·3 kg ... ... Five **£4·20** Each **£0·90** *m*


MA-520

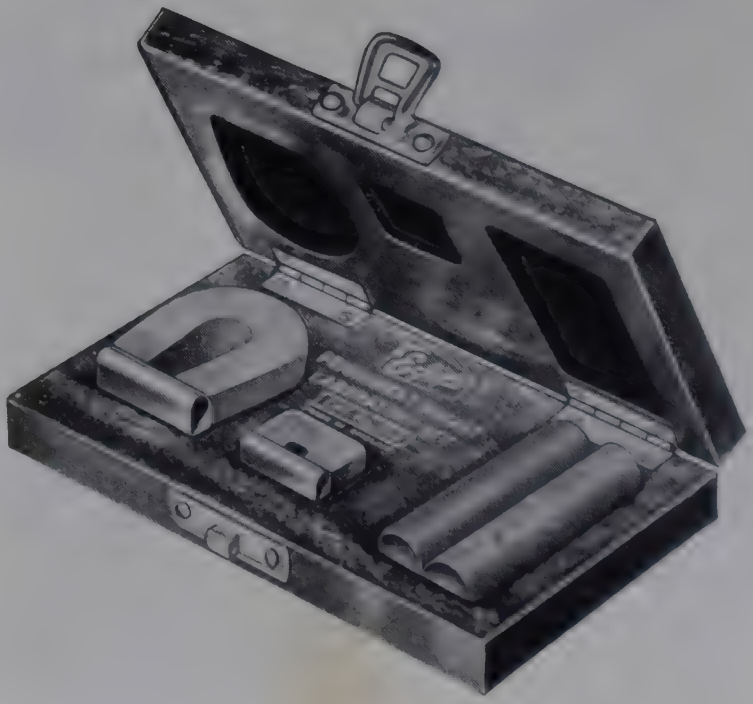
MA-530

MAGNET, high field strength, made from '*Alcomax*'. May be used for the magnetisation of other permanent magnets, testing materials for diamagnetism and paramagnetism, field plotting, demonstrating moving coil galvanometers, motors etc. Overall height 10 cm, distance between poles 4 cm or between removable pole pieces 2·7 cm ... ... Each **£10·30** *m*


MA-530

MA-540

MAGNETS, laboratory set, made from '*Alnico*', comprising a pair of bar magnets of length 50 mm, a bridge magnet of overall height 23 mm, and a horseshoe magnet of overall height 35 mm, with keepers, in fitted wooden case ... ... Set **£1·85** *m*


MA-540

Gallenkamp
REGD TRADE MARK

MAGNETIC STIRRERS

Compact variable speed stirrers, available with or without hotplate, which produce from gentle to vigorous stirring action suitable for:

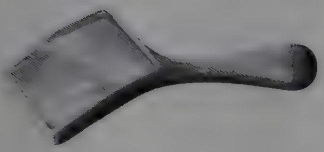
- **Titrations**
- **Controlled precipitations**
- **Rapid preparation of solutions**
- **Agitation during electrochemical tests**
- **Agitation of sterile liquids**
- **Agitation within vacuum systems**

For details and prices see SS-610 et seq. in List No. sequence.

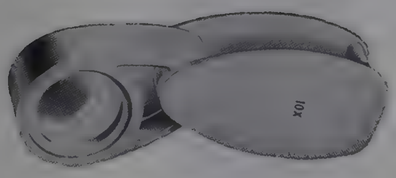
All items on this page normally available from stock.

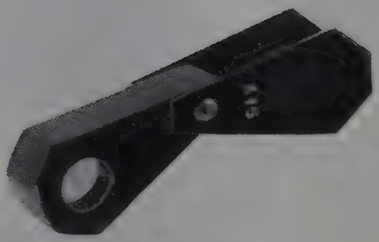
MA-660

MA-670


MA-700

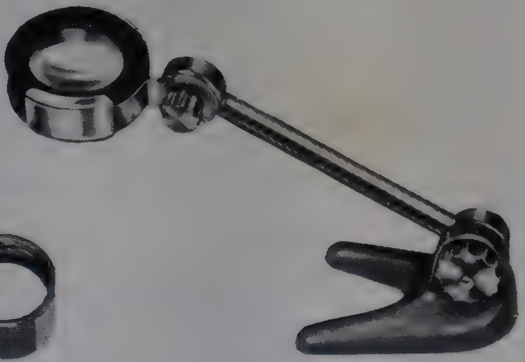
MA-712

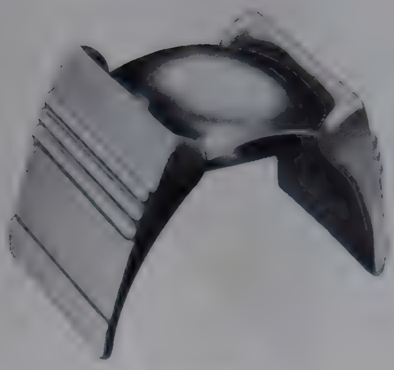

MA-730



MA-740

MA-765


MA-795


MA-805

MA-820

MAGNIFIERS

Important note. All magnifications quoted in this section refer to linear magnification, not area.

MA-660

MAGNIFIER, watchmaker's eye glass, magnification × 1·8. Plastics lens and mount.
Ten **£1·10** Each **£0·18** *m*

MA-670

MAGNIFIER, lens dia. 64 mm, magnification ×1·5, with metal rim and plastics handle.
Ten **£8·80** Each **£0·98** *c*

MA-700

MAGNIFIER, aspheric, with plastics lens 82 × 64 mm, magnification ×1·3, designed to give a good correction for distortion and field curvature, with plastics frame and handle ... ... Each **£2·87** *m*

***MA-712**

MAGNIFIER, pocket type, black plastics frame with two lenses, dia. 25 mm, magnification of each lens separately ×2 or combined ×2·5 ... ... Each **£0·40** *m*

MA-730

MAGNIFIER, aspheric, aplanatic pocket type, with folding plastics lens consisting of an air-spaced non-achromatic aspheric doublet of magnification ×3·2 and aperture 18 mm, in plastics frame ... Each **£1·57** *m*

MA-740

MAGNIFIERS, aplanatic, pocket type, in metal frame.

Magnification	×10	×15	
Aperture dia.	13	8 mm	
Each	**£3·20**	**3·60**	*m*

MA-765

MAGNIFIER, illuminated. A powerful, hand magnifier fitted with 38·5 mm diameter lens, magnification ×8, and having built-in subject illumination powered by two U-11 batteries in the handle. Supplied with batteries and leathercloth covered case ... ... Each **£6·75** *m*

MA-795

MAGNIFIER, Falmer, with aperture 27 mm dia., magnification ×5, complete on adjustable stand with telescopic tubular arm and locking screws.
Each **£2·20** *m*

MA-805

MAGNIFIER, aspheric, in plastics stand. Plastics lens 70×57 mm, magnification ×1·7 with head at a distance of 25 cm from lens. The small field curvature enables comfortable binocular vision over a wide field.
Each **£3·15** *m*

MA-820

MAGNIFIER, linen tester, with bi-convex optically worked glass lens, magnification ×8, in folding plastics frame, with aperture ½×½ in.
Ten **£2·75** Each **£0·34** *m*

All items on this page normally available from stock.

MAGNIFIERS

MA-845

MAGNIFIER, illuminated, *Anglepoise.* Has a high powered lens 11×8 cm with a 25W lamp on either side controlled by a push on/off switch. The lens assembly has convenient handles and is mounted on an *Anglepoise* arm giving instant adjustment over a 150 cm diameter. Magnification ×2. Supplied with a heavy base.
Each **£14·70** *m*

MA-845

MA-854

MAGNIFIER, wide angle, illuminated, bench standing. The swivelling aspheric lens provides undistorted stereoscopic subject enlargement greater than ×2. Lens 165×102 mm, focal length 213 mm, maximum depth 216 mm. Lens height and angle are fully adjustable. Illumination is by two fluorescent tubes. Complete in leathercloth covered case. For 220/250V a.c. supplies.
Each **£31·00** *m*

MA-854

THERMOMETER READING MAGNIFIERS, see TJ-900 and TJ-905 in List No. sequence.

Olympus
LOW POWER STEREOSCOPIC MICROSCOPES.
For details and prices see ML-330 et seq. in List No. sequence.

STEREOSCOPIC MAGNIFIER

A free standing stereoscopic magnifier with built-in top illumination for the examination of surfaces or solid objects. The *Stereomaster* is suitable for Nuffield 'O' and 'A' level biology courses.

A heavy base houses a transformer which supplies the low voltage illuminating lamp. A vertical 300 mm steel pillar supports a 250 mm knuckle arm upon which is mounted the focusing mechanism of the optical head which provides an upright image. The prism boxes are coupled for adjustment of interpupillary distance.

Table of magnifications, working distances and fields of view.

Supplementary lens	Overall magnification	Working distance mm	Field of view mm
None	×10	160	21
×2	×20	90	10
×3·5	×35	90	6·5

MA-900

MAGNIFIER, *Prior Stereomaster,* as specification, with ×10 stereoscopic head and dust cover. For 220/240V a.c. single phase supplies ... ... Each **£44·50** *f*

MA-900

REPLACEMENT PART

MA-905	**Lamp bulbs, 6V, 6W.**	Ten	**£1·00**	Each	**£0·17**	*f*

ACCESSORIES

MA-910	**Supplementary lens ×2**	Each	**£6·50**	*f*
MA-912	**Supplementary lens ×3·5**	Each	**£10·00**	*fN*

Items on this page normally available from stock except those coded *N*.

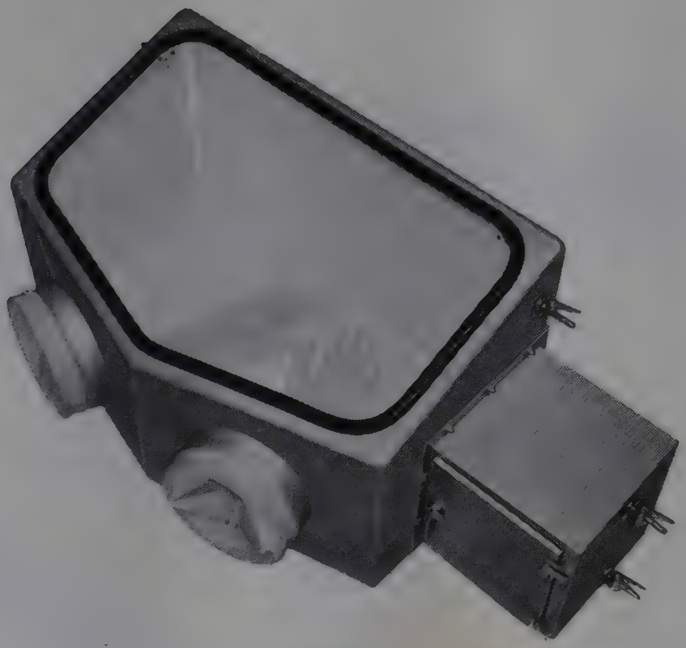
Gallenkamp MANIPULATOR GLOVE BOX

For many applications where user and sample must be mutally isolated, including handling of bacterial colonies and low radioactivity isotopes.

- **Incorporates automatic air-lock loading hatch**
- **Easily cleaned interior**
- **Rapid glove replacement—optional range of sizes**
- **Suitably constructed for slight depressurisation**

Toxic materials may be handled in dry powder form without danger from airborne particles. Hygroscopic substances can be handled without difficulty and operations where it is necessary to exclude air, or work under dust-free conditions, are possible with this apparatus. In bacteriological work, operators may to a large extent be protected from infection.

Alpha emitters and/or purely beta emitters, for example C^{14} compounds, can be safely and conveniently handled in this apparatus and the health hazard associated with carrying out many radiochemical reactions and operations is reduced to a minimum. Operations involving grinding, stirring, filtering, gentle heating etc. may be carried out and the box can be evacuated to about 757 torr (1½ in w.g.).



MA-950

EXTERNAL DIMENSIONS

Manipulator box (excluding hatch)	69 × 45 × 42 cm high
Loading hatch	22 × 22 × 21 cm high
Loading hatch door	15 × 16 cm
Glove ports	16·5 cm dia.
Top window	61 × 37 cm max.
Maximum width	102 cm

CONSTRUCTION

The box and loading hatch are made from heavy gauge steel sheet, rustproofed and stove enamelled. All the corners of the box are radiused to permit easy cleaning. Rubber feet are fitted to the base. The large Perspex window is sealed in place by an air-tight gasket. Two glove ports at the front are fitted with ambidextrous rubber gauntlets held in place by stretching their beaded sleeve ends over the openings of the ports. Gloves are thus replaced easily and quickly but a double groove on each glove port prevents the gloves from being detached accidentally.

The loading hatch is in the form of an automatic air-lock with two air-tight doors interconnected by a neat interlocking mechanism to prevent either being opened until the other is correctly shut. Both the box and loading hatch are fitted with stopcocks for connection to dry air or inert gas supply. The box is supplied with an internal polystyrene tray 46 × 35 cm.

MA-950

MANIPULATOR GLOVE BOX, *Gallenkamp*, as specification, supplied with two MA-955 latex gloves size 9. If alternative gloves required, please state List No. and size when ordering ... ... Each **£122·00** *b*

ACCESSORIES AND REPLACEMENTS

MA-953 **Sleeve,** rubber, open ended, beaded at both ends to fit glove port and to seal on wrist allowing surgical gloves to be worn... ... Ten **£11·00** Each **£1·25** *m*

MA-955 **Gloves,** gauntlet with beaded edge, ambidextrous, **natural latex.**

Size	7	8	9	10	
Per ten gloves	£18·00	18·00	18·00	18·00	*m*
Per glove	£ 2·00	2·00	2·00	2·00	

MA-957 **Gloves,** as MA-955 but in **neoprene.**

Size	7	8	9	10	
Per ten gloves	£22·00	22·00	22·00	22·00	*m*
Per glove	£ 2·45	2·45	2·45	2·45	

Glove size fitting measurements see instructions on page 140.

All items on this page normally available from stock.

MANIPULATOR BOXES

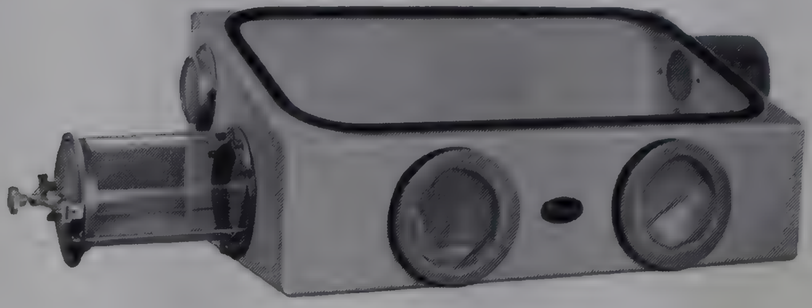
MA-970

MANIPULATOR GLOVE BOX, for handling low activity radioisotopes, bacteria, toxic substances and other hazardous materials. An important feature is the hermetically sealed air lock, equipped with quick action doors, permitting passage of materials in and out of the box without affecting the internal conditions.

The box is fabricated from mild steel, finished internally white glaze vitreous enamel, with radii on all corners. An extraction fan maintains a slight negative pressure against the possibility of small leaks at the glove ports or air lock. Air is exhausted through a disposable micro-filter; air entering the cabinet is filtered down to 2 microns. There are two glove ports fitted with gauntlets MA-955 size 9 for manipulation of apparatus within the box. The viewing panel is plate glass. A removable panel at one end can be adapted to take any services required inside the box. For 220/240V 50 Hz single phase supplies.

Dimensions

Manipulator box 77 × 51 × 38 cm high
Overall width 135 cm Each **£160·00** *fS*



MA-970

If alternative gloves required please state List No. and size when ordering.

ACCESSORIES AND REPLACEMENTS

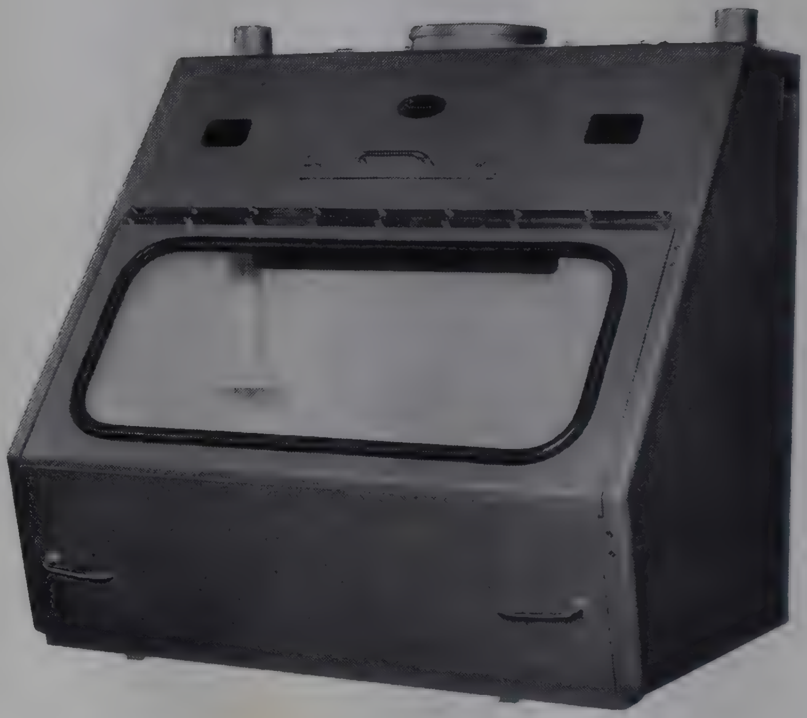
MA-955	**Gloves,** latex	For details and prices see entries in List No. sequence.
MA-957	**Gloves,** neoprene	

MA-980

MANIPULATOR BOX, PATHOLOGICAL. Conforming with British Medical Council practice, this unit ensures positive protection to operators in the preparation of cultures and grinding of contaminated tissues and other hazardous operations. Suitable for bench mounting and fabricated from mild steel, the interior of the cabinet is finished white stoved enamel with well radiused corners. In service there is an air flow across the cabinet aperture giving an air change every 25 seconds. The exhaust air is passed through an expendable filter which is arranged so that it need not be handled prior to incineration. The filter element container may be sterilised by UV rays. Complete with 60W striplight, UV lamp with safety cut-out, flue for Bunsen burner and front closure plate.

Dimensions

94 × 64 × 84 cm high Each **£242·00** *f*



MA-980

When ordering please state voltage and frequency of supply.

MA-990

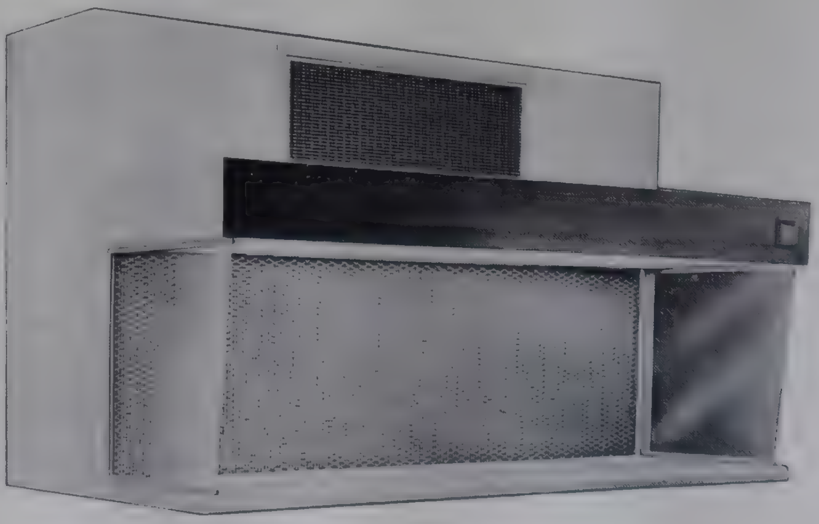
CLEAN AIR CABINET, bench mounting, in which a laminar flow of filtered air provides a dust-free virtually sterile working space. A low-noise fan is used to pass air into the cabinet through a washable pre-filter and a bacteriological filter. The air flow of 28 ± 7 metres/minute is towards the operator. Interior illumination is provided by built-in fluorescent lamps. Separate fan and lighting switches are fitted. The cabinet has white melamine laminate external surfaces and the interior is blockboard.

Dimensions

Overall 96 × 108 × 118 cm high
Working space 88 × 61 × 57 cm high
For 220/240V 50 Hz single phase supplies.
Each **£245·00** *f*

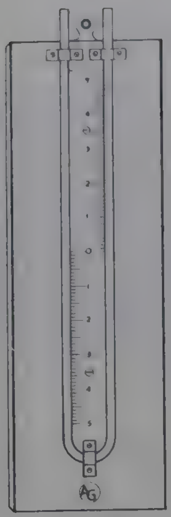
MA-992

CLEAN AIR CABINET, as MA-990 but **mounted on a supporting trolley** fitted with heavy duty castors. The working surface is 76 cm from the floor.
For 220/240V 50 Hz single phase supplies.
Each **£265·00** *f*

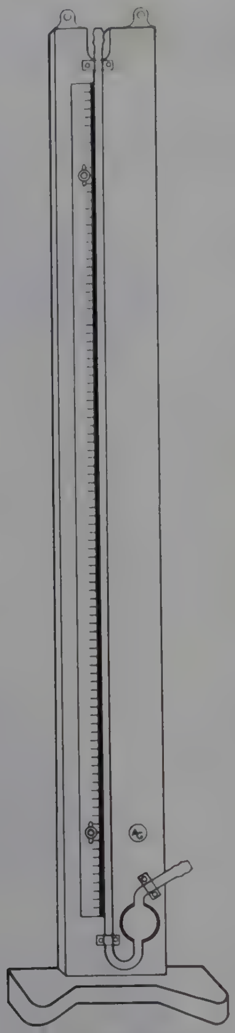


MA-990

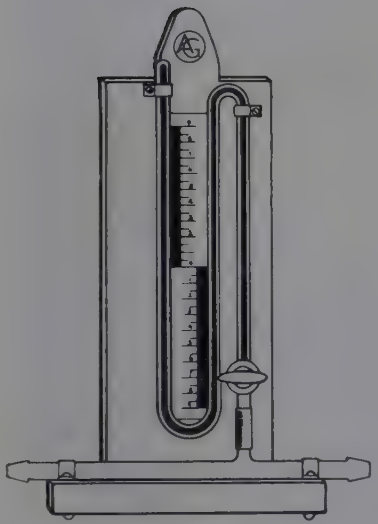
Items on this page coded S normally available from stock.



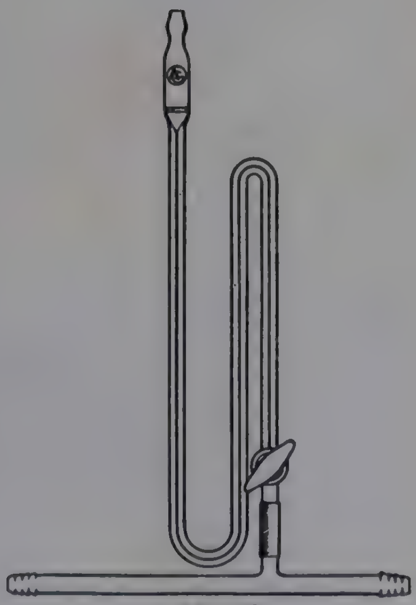
MB-020
MB-026



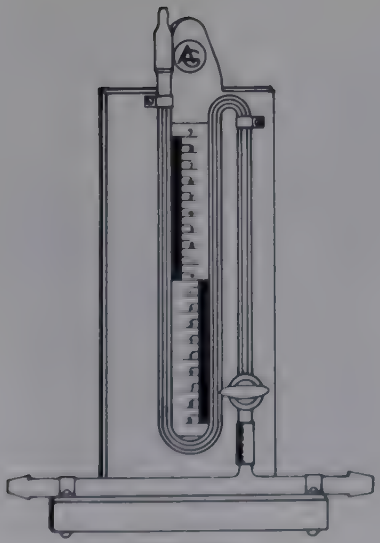
MB-030
with MB-040



MB-050



MB-062



MB-060

MANOMETERS

MB-020

MANOMETERS, (AG), for pressure or vacuum, on hardwood board, with boxwood scale graduated in mm up and down on opposite sides from the centre zero. For mounting on wall or cast iron foot MB-040, if required. **Without foot or mercury.**

Scale above and below zero	25	50 cm	
Each	£2·90	4·75	a

MB-022 **Glass U-tubes,** spare, for MB-020.

Size	25	50 cm	
Each	£0·55	1·05	a

MB-026

MANOMETERS, (AG), as MB-020, but graduated in 0·1 in with wider bore glass tube for use with water. **Without foot.**

Scale above and below zero	5	10 in	
Each	£2·55	2·90	a

MB-028 **Glass U-tubes,** spare, for MB-026.

Size	5	10 in	
Each	£0·45	0·55	a

MB-030

MANOMETER, (AG), single tube and reservoir pattern, on hardwood board, with sliding boxwood scale graduated 0–100 cm in mm. For mounting on wall or cast iron foot MB-040, if required. **Without foot or mercury.** Each **£6·10** a

MB-032 **Glass part,** spare, for MB-030 ... ... Each £1·30 a

For suitable mercury see MF-932 in List No. sequence.

MB-040

FOOT, cast iron, for use with manometers MB-020, MB-026 and MB-030 ... ... Each **£3·00** b

VACUUM MANOMETERS

MB-050

MANOMETER, Anschutz, (AG), with stopcock, on wooden stand with adjustable anodised aluminium scale, graduated 10–0–10 cm in mm. Supplied evacuated and filled with mercury to the stopcock, and therefore requires adjustment of the charge before use ... Each **£7·20** a

MB-052 **Glass part,** spare, for MB-050, with stopcock, unfilled. Each £2·55 a

MB-054 **Glass part,** spare, as MB-052, but mercury filled. Each £4·40 a

MB-060

MANOMETER, Anschutz, (AG), borosilicate glass, as MB-050, with stopcock and **sintered glass seal** instead of closed end. Easily filled by adding a few ml of mercury to the funnel to produce a seal, and then by applying gentle suction to the funnel nozzle, mercury is introduced through the stopcock to fill the capillary. Air displaced from the capillary passes through the fritted plate. On wooden stand, with adjustable anodised aluminium scale graduated 10–0–10 cm in mm. **Without mercury.** Each **£5·85** a

MB-062 **Glass part,** spare, for MB-060, with stopcock. Sintered plate dia. 10 mm ... ... Each £2·95 a

For suitable mercury see MF-932 in List No. sequence.

GJ-300

PRESSURE GAUGES, Bourdon tube pattern.

GJ-330

VACUUM GAUGES, Bourdon tube pattern.
For details see entries in List No. sequence.

All items on this page normally available from stock.

MEASURES

MB-870

MEASURES, graduated, Board of Trade stamped, conical form to BS 1922.

Capacity	5	10	25 ml	
Subdivided	1	1	5 ml	
Ten	£5·80	8·60	8·80	c
Each	£0·64	0·96	0·98	
Capacity	50	100	250 ml	
Subdivided	5	10	25 ml	
Ten	£9·40	9·80	10·40	c
Each	£1·04	1·08	1·16	

MB-875

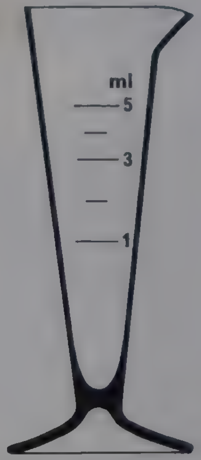
MEASURES, graduated, Board of Trade stamped, beaker form to BS 1922.

Capacity	500	1000 ml	
Subdivided	50	100 ml	
Ten	£11·60	14·80	c
Each	£ 1·30	1·65	

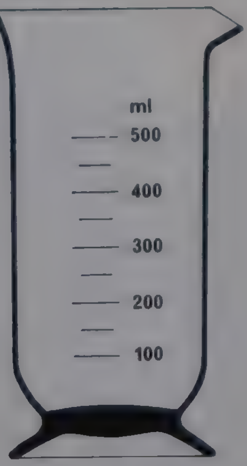
MB-920

MEASURE, graduated polythene, conical form with two double scales graduated in 0–500 cm³ in 50 cm³ and 0–20 fl. oz in 1 fl. oz for right and left hand use. With detachable polythene foot to improve stability.

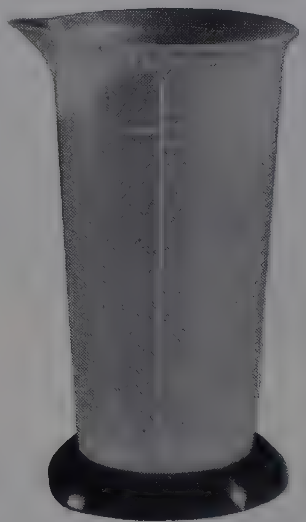
Ten **£1·90** Each **£0·25** *m*



MB-870



MB-875



MB-920

Measuring jugs	see JV-100 et seq.
Measuring microscopes	see CD-400 et seq.
Measuring rules	see RX-021 et seq.
Measuring tapes	see RX-105

For details and prices see entries in List No. sequence.

Technico GRADUATED MEASURING CYLINDERS

REGD. TRADE MARK

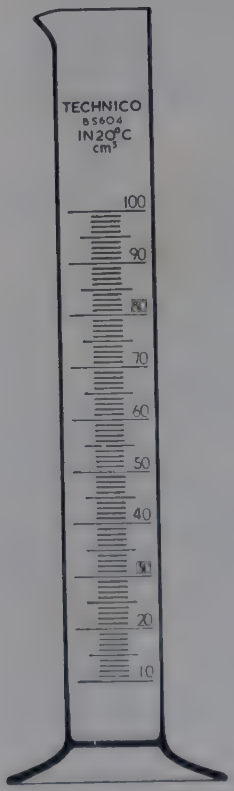
Manufactured in our own factory to comply with the requirements of BS 604

- **With permanent graduations and inscriptions in amber stain**
- **Capacities 5 to 2000 cm³**
- **Available with works certificate of examination**

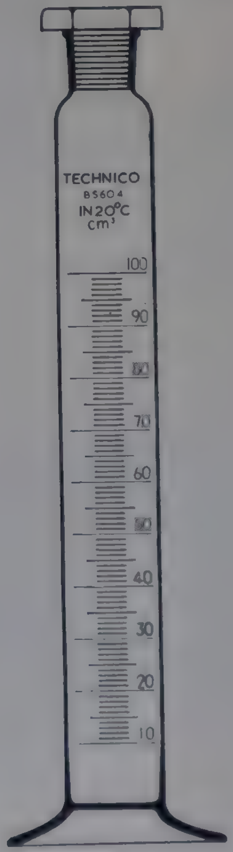
CYLINDERS with spout see CY-104/105

CYLINDERS with stopper see CY-244/245

For details and prices see entries in List No. sequence.



CY-104



CY-244

All items on this page normally available from stock.

MEDICAL SCIENCES

A wide range of laboratory apparatus and instruments specifically required in **Bacteriological, Biochemical** and **Physiological** laboratories in hospitals, universities and clinics is listed alphabetically in this section.

More general apparatus used in medical laboratories appear elsewhere in the catalogue.

Useful cross reference lists are given below.

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Baskets for sterilising see Sterilisers
Blood alcohol see Quickfit apparatus
Blood storage cabinet see Refrigerators
Bottles, culture see Culture apparatus
  general see Bottles
Boxes, sterilising see Sterilisers
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Colony counter }
Cotton wool }
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  flasks } see Culture apparatus
  tubes }
Dishes, Petri }
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Forceps see Dissecting equipment
Fraction collector see Chromatography
Glove boxes see Manipulator boxes
Mercury vapour meter see Mercury
Micro burette see Burettes
Microscope slides and cover glasses see Histology
Petri dishes see Culture apparatus
Photometer, grey wedge see Colorimeters
Plates, agglutination etc. see Plates
Pumps, filter see Filter pumps
  vacuum see Vacuum pumps
Racks, sterilising see Sterilisers
Roll tube equipment see Culture apparatus
Scalpels }
Scissors } see Dissecting equipment
Staining equipment see Histology
Tally counters see Counters
Teats, rubber see Rubber sundries
Tubes, agglutination see Test tubes
Wasserman baths see Water baths

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Autoclaves
Calorimeters
Centrifuges
Chromatography
Colorimeters
Culture
Dissecting
Filters
Flame analyser
Freeze drying
Histology
Incubators
Magnifiers
Microchemical apparatus
Microscopes
Micromanipulators
Microtomes
Nitrogen determination
Ovens
Pipettes
Refrigerators
Sterilisers
Syringes
Water baths

AMPOULE CUTTERS

MC-360

AMPOULE FILE, flat shape ... Per 1000 **£2·15** c

AMPOULE CUTTERS, see glass tube cutters GP-175 and GP-180 in List No. sequence.

Gallenkamp AUTOCLAVES

For electric, gas or steam heating.

Designed in accordance with BS 2646 for sterilisation up to 2·1 kgf/cm² (30 lbf/in²).

Approved by the Associated Offices Technical Committee for insurance purposes and accepted by insurance companies. Each autoclave is fully tested under working conditions prior to despatch and a certificate is supplied showing essential details of construction and of pressure tests applied during manufacture.

See AX-100 et seq. in List No. sequence.

Also available, a range of automatic, portable and other vertical and horizontal autoclaves to suit a variety of applications—see AX-250 et seq.

AX-100

Gallenkamp

SLIDING WEIGHT BALANCES

Sturdily constructed beam balances designed to withstand rough usage and eminently suitable for heavy duty in hospital laboratories.

Dual scaled with built-on weights:

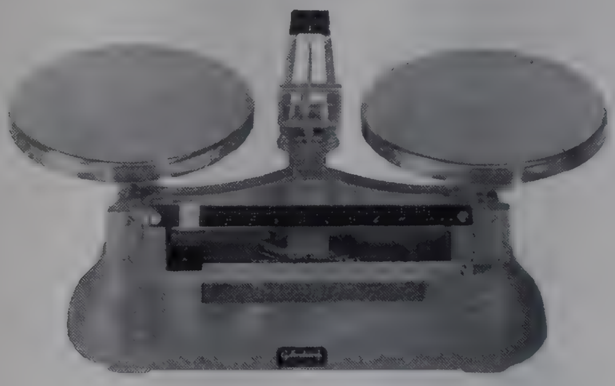
Upper scale—0–10 g in 0·1 g.
Lower scale—0–200 g in 10 g.

Total capacity 2000 g with external weights.

Available with circular pans and scoops in stainless steel and chromium plate.

See BC-110 et seq. in List No. sequence.

Also available, an extensive range of student, analytical and precision type balances, including the famous *Mettler* models, for all biological, medical and allied applications—see BA-500 et seq.


BC-110

Gallenkamp

BALLISTIC BOMB CALORIMETER

For the rapid determination of calorific values of foodstuffs and faeces in dietetic and metabolic research and other applications.

The Ballistic Bomb Calorimeter was developed in collaboration with D. S. Miller and P. R. Payne at the Human Nutrition Research Unit of the M.R.C.

See CB-370 et seq. in List No. sequence.

Also available, *Gallenkamp* AUTOBOMB Automatic Adiabatic Bomb Calorimeter for high accuracy tests to standard methods—see CB-100 et seq.

Gallenkamp
CB-370

All items on this page normally available from stock.

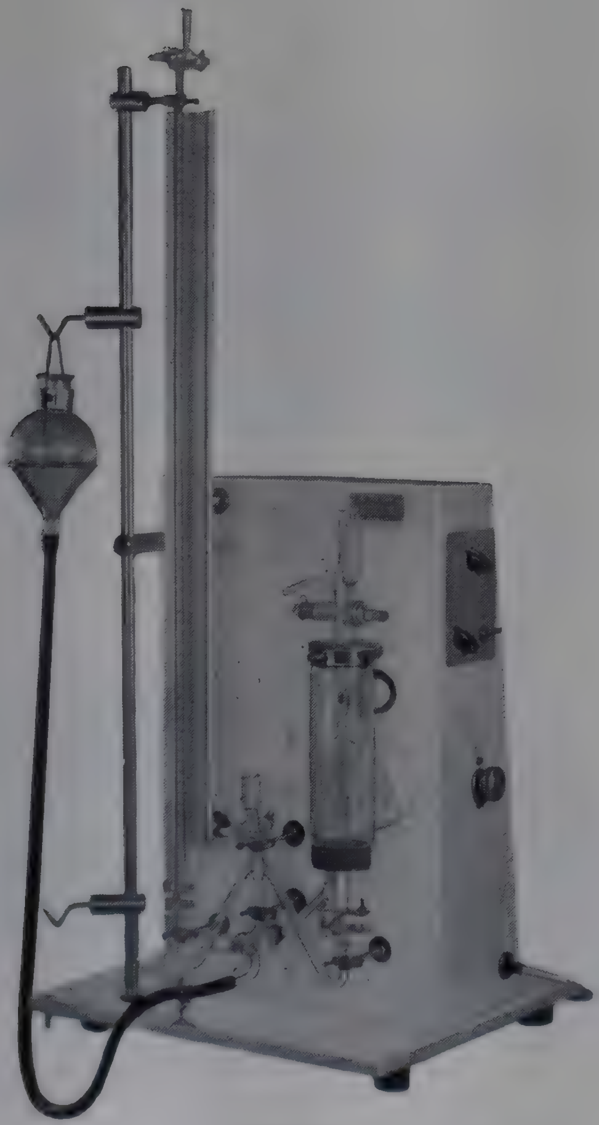
Gallenkamp VAN SLYKE APPARATUS

MANOMETRIC APPARATUS WITH MAGNETIC AGITATION

For the determination of gases in blood, plasma and urine, and other applications.

- **Interchangeable glassware, easily replaced**
- **Optional macro and micro reaction pipettes**
- **Built-in illuminator, timer and buzzer**

The original apparatus was devised by Dr. Donald D. Van Slyke and is fully described, together with detailed methods of use, in 'Quantitative Clinical Chemistry' Vol. 2 by Peters and Van Slyke. The *Gallenkamp* apparatus incorporates magnetic agitation and many other carefully tested refinements.



MC-500

DESCRIPTION

The apparatus stands on a mercury tray fitted with a drain plug. All glassware mounting clamps are easily adjusted and quickly removed for dismantling and cleaning the glassware. A lamp is fitted behind the reaction pipette for improved observation.

A motor driven magnet rotates a follower in the reaction pipette. The motor position is adjustable to give optimum stirring conditions so that complete reaction normally occurs within three minutes.

The stout glass manifold, which connects with both manometer and reaction pipette by interchangeable spherical joints, has side tubes shaped to prevent gas bubbles being trapped at the bends. Large surface stopcocks provide good mercury control without the need for frequent regreasing.

The apparatus is fitted with a clockwork driven time switch, range up to 8 minutes, and a warning buzzer.

REACTION PIPETTES

The standard reaction pipette is graduated at 50, 2 and 0·5 cm³ and the funnel to 10 cm³ with 1 cm³ sub-divisions. It is mounted in a water jacket fitted with a thermometer.

The Rappaport [1], [2] pipette for determinations of CO_2 in 0·1 ml blood samples, is interchangeable with the standard pipette. It is useful where normal quantities of sample are unobtainable (for example in paediatric cases) and comprises a reaction vessel with a 7 ml bulb containing a magnetic follower and a stem with a capacity of 0·4 cm³, sub-divided in 0·01 cm³. The funnel is calibrated to 1·5 cm³ in 0·1 cm³. It is mounted in a water jacket fitted with a thermometer.

MC-500

VAN SLYKE MANOMETRIC APPARATUS, *Gallenkamp*, as specification, fitted with standard reaction pipette assembly MC-504. Requires but does not include 2 kg mercury.

For 200/250V 50 Hz	Each	**£90·00**	*b*
For 100/120V 60 Hz	Each	**£90·00**	*b*

MC-502

VAN SLYKE MANOMETRIC APPARATUS, *Gallenkamp*, as specification, fitted with **Rappaport** micro reaction pipette assembly MC-506.

For 200/250V 50 Hz	Each	**£86·00**	*b*
For 100/120V 60 Hz	Each	**£86·00**	*b*

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1. Rappaport, Eichorn and Nutman, J. Clin. Path., **9**, 1956, 166.
2. Rappaport, Eichorn and Nutman, Clin. Chim. Acta, **1**, 1956, 305

All items on this page normally available from stock.

Gallenkamp VAN SLYKE APPARATUS

MANOMETRIC APPARATUS (CONTINUED)

CONVERSION ACCESSORIES

MC-504

STANDARD REACTION PIPETTE ASSEMBLY, to convert MC-502 into MC-500, comprising pipette MC-514, water jacket, thermometer TJ-380, rubber stoppers and supporting bracket, supplied with three magnetic followers ... ... Set **£15·00** *a*

MC-506

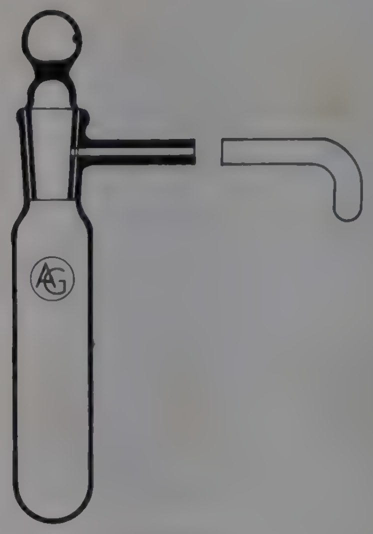
MICRO REACTION PIPETTE ASSEMBLY, Rappaport, to convert MC-500 into MC-502, comprising pipette, water jacket, thermometer, rubber stoppers, supporting bracket and thermometer clip, supplied with three magnetic followers. Set **£11·50** *a*

REPLACEMENT PARTS for MC-500 and MC-502

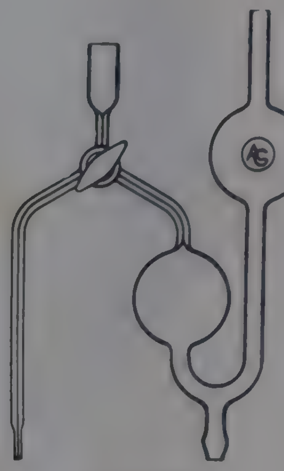
MC-510	**Manometer tube**	Each	**£5·80**	*a*
MC-512	**Manifold**	Each	**£5·60**	*a*
MC-514	**Reaction pipette,** standard	Each	**£7·60**	*a*
TX-770	**Tubing,** vinyl, 6·35 mm (125 cm reqd.) ...	For prices see entries in List No. sequence.		
TJ-380	**Thermometer,** 10° to 40°C for water jacket			
MF-920	**Mercury reservoir,** heavy glass, 250 ml ...			
MF-378	**Lamp,** 15W			

ACCESSORIES

MC-521	**Gas pipette, Hempel-Van Slyke,** Ⓐ, **borosilicate glass,** capacity 50 ml, for introduction of gaseous samples into Van Slyke gas analysis apparatus.	Ten **£30·00** Each **£3·30**	*a*
MC-524	**Ninhydrin reaction vessel,** Ⓐ, for the gasometric determination of free amino acids in blood filtrates by the ninhydrin—CO_2 method (Hamilton and Van Slyke, **J. Biol. Chem. 150,** 1943: 231). For use with MC-500 only	Each **£1·75**	*a*
ME-340	**Pipettes, Ostwald-Van Slyke,** *Technico* Class A, 0·2 to 5 cm³...	For details and prices see entries in List No. sequence.	
ME-342	**Pipettes, Ostwald-Van Slyke,** as ME-340 but with stopcock		
ME-344	**Pipettes, Ostwald-Van Slyke,** *Technico* three-mark pipette for Rappaport reaction pipette, 0·05 and 0·01 cm³		
ME-346	**Pipettes, Ostwald-Van Slyke,** as ME-344 but with stopcock		
MF-932	**Mercury,** triple distilled		
LX-110	**Lubricant,** suitable for stirrer motor ...		
WB-100	**Wash bottle,** polythene		
VB-882	**Lubricating grease,** Apiezon-M, for stopcocks		
TJ-900	**Reader,** for manometer, ×5 magnification.		



MC-524



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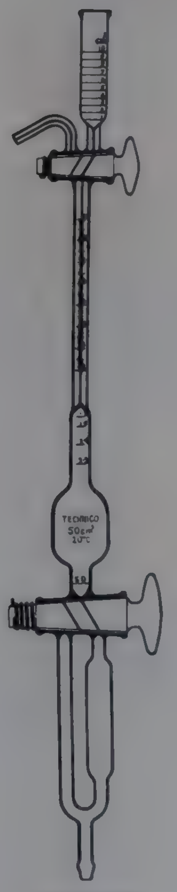


MC-550

VOLUMETRIC APPARATUS

MC-550

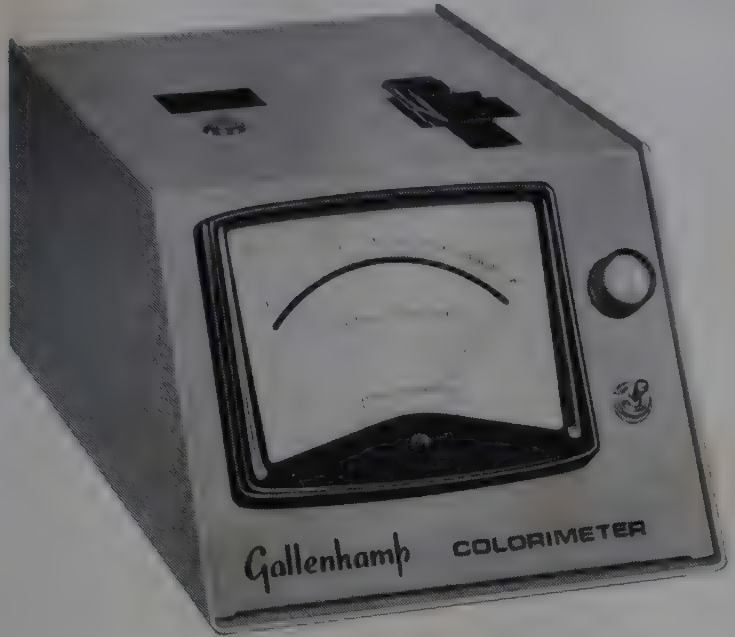
BLOOD GAS APPARATUS, VAN SLYKE, volumetric, *Technico*, a simple apparatus for the determination of CO, CO_2 and O_2 in blood or blood plasma.
Without reagents ... ... Each **£6·00** *a*

ACCESSORIES

MC-521	**Pipette, Hempel-Van Slyke,** for use with MC-550 for the admission of gas samples to the top of the manometer bulb.
ME-340	**Pipettes, Ostwald-Van Slyke.**
ME-342	**Pipettes, Ostwald-Van Slyke.**

For details and prices of the above see entries in List No. sequence.

All items on this page normally available from stock.


CS-200

Gallenkamp COLORIMETER

For a wide range of colorimetric determinations with blood, urine and other body fluids in clinical and biochemical laboratories.

- Transistorised stabiliser circuit.
- Rapid response—stable readings.
- Mirror scale reads optical density direct.
- Polypropylene 3-position cell holder.
- Simple to operate and maintain.
- Optional flow through cell.

Accuracy—about 1% by direct reading; better with calibration curve.

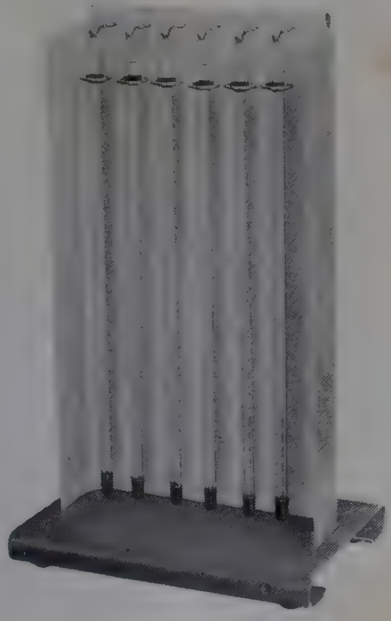
Stability—total drift over long periods less than 0·005 o.d. units after 10 minute warm-up period.

Sample heating—only about 5degC over a period of 2 hours.

Available with a range of colour filters, test cells, cell holders and adapters.

See CS-200 et seq. in List No. sequence.

MC-670


MC-670 with MC-675

MC-670

BLOOD SEDIMENTATION TUBE, Westergren, *Technico*. Overall length 30 cm with top zero graduated to 20 cm at the jet, subdivided in mm. The jet is externally ground to bevel so that the lowest 5 mm graduations do not appear. To BS 2554.
Dozen **£2·25** Each **£0·25** *a*

MC-675

METAL STAND, to suspend six Westergren tubes MC-670 or Wintrobe tubes MC-700. The tubes are suspended in hangers in such a way as to ensure that the axes of the tubes are vertical. The stand is made of stove enamelled aluminium sheet and is fitted with rubber feet. Six hangers with PVC grommets and six rubber policemen are provided ... ... Each **£4·20** *b*

REPLACEMENT PARTS

MC-676	**Hanger,** with PVC grommet ...	Pack of 6	**£1·25**	*b*
RV-180	**Rubber policemen,** int. dia. 6 mm. For price see entry in List No. sequence.			

MC-700

BLOOD SEDIMENTATION TUBE, Wintrobe, *Technico*, capillary glass. Overall length 11 cm, graduated 0 to 10 cm in 1 mm divisions. To BS 4316, Fig. 1.
Dozen **£3·30** Each **£0·34** *a*

MC-705

HAEMATOCRIT SEDIMENTATION TUBE. Overall length 5 cm with top zero, graduated in mm to the jet which is ground to a bevel.
Ten **£5·20** Each **£0·58** *c*

MC-752

BLOOD SUGAR TUBE, Folin-Wu, *Technico*, graduated at 12·5 and 25 cm³. With 40 mm long, 8 mm diameter constricted tube leading to bulb of 4 ml capacity.
Dozen **£3·70** Each **£0·37** *a*

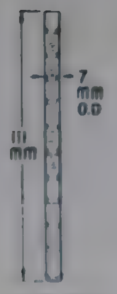
Q-BC11 with Q-MF 24/3/8

BLOOD UREA APPARATUS, Maclean, *Quickfit*, for estimation of urea in blood.

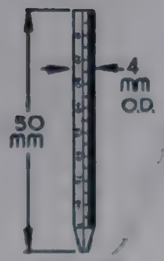
Q-2BC

CAVETT FLASK, *Quickfit*, for the micro-scale determination of alcohol in blood.

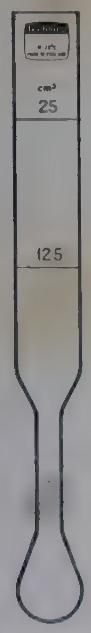
For details of above items see entries under QUICKFIT APPARATUS.



MC-700



MC-705



MC-752

All items on this page normally available from stock.

MICRO-HAEMATOCRIT CENTRIFUGE

This centrifuge is used for the determination of red blood cell volume by the micro capillary method using a speed up to 11,000 rev/min, equivalent to 12,000 g which reduces centrifuging time to a maximum of 5 minutes.

CONSTRUCTION AND CONTROLS

The centrifuge has a robust cast bowl and cover and is fitted with a quiet running universal motor which has permanently lubricated bearings.

A built-in automatic timer starts the centrifuge when set to the required period which may be between 1 and 14 minutes. Operating speed is reached within a few seconds of starting and a brake is fitted for rapid retardation when required.

MD-010

MD-010

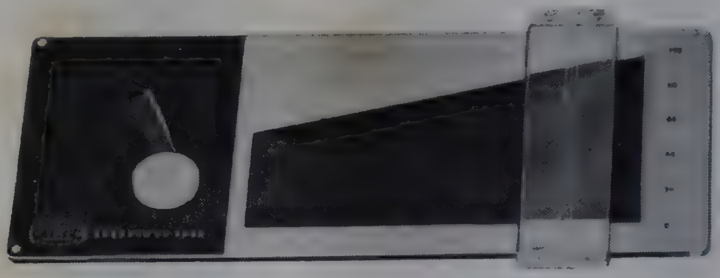
CENTRIFUGE, MICRO-HAEMATOCRIT, *Hawksley,* as specification with standard head which accepts up to 24 disposable micro capillary tubes in radial numbered slots without the necessity of balancing. The head is fitted with an inner cover to reduce windage and consequent vibration.

For 220/240V a.c. single phase supplies. Each **£65·00** *f*

When ordering please state voltage and frequency of supply.

ACCESSORIES for standard head

MD-020	**Capillary tubes, heparinised,** 50 µl capacity, for use with direct capillary blood. In pack of 1000.	Pack	**£5·00**	*m*
MD-022	**Capillary tubes, plain,** as MD-020 but for venous blood. In pack of 1000	Pack	**£3·75**	*m*
MD-023	**Lancet, disposable,** for taking blood samples. Each lancet in sterile pack. Supplied in pack of 250.	Pack	**£1·12**	*f*


MD-055

MICRO-HAEMATOCRIT READER

A precision capillary tube reader giving accurate readings of the percentage packed red cell volume.

A capillary tube is inserted in the carrier slot so that the base-line of the reader intersects the base of the red cells. The holder is moved so that the top line intersects the plasma-air interface. The angle of the cursor is adjusted until the white line intersects the red-white cell interface and then percentage packed red cell volume is read directly from the scale.

MD-055

MICRO-HAEMATOCRIT READER, as specification. Each **£4·95** *f*

Gallenkamp CENTRIFUGES

Semi-micro centrifuge—a low priced machine used in colleges and medical schools in lieu of filtration for small scale separations. See CF-200.

Junior centrifuge—a reliable, safe, yet inexpensive centrifuge for hospital use. The flexible mountings of the motor provide **a self-balancing action.** See CF-405.

Universal centrifuge—a robust, large capacity, general purpose centrifuge with solid state speed control and a range of heads, suitable for routine and research applications. See CF-600.

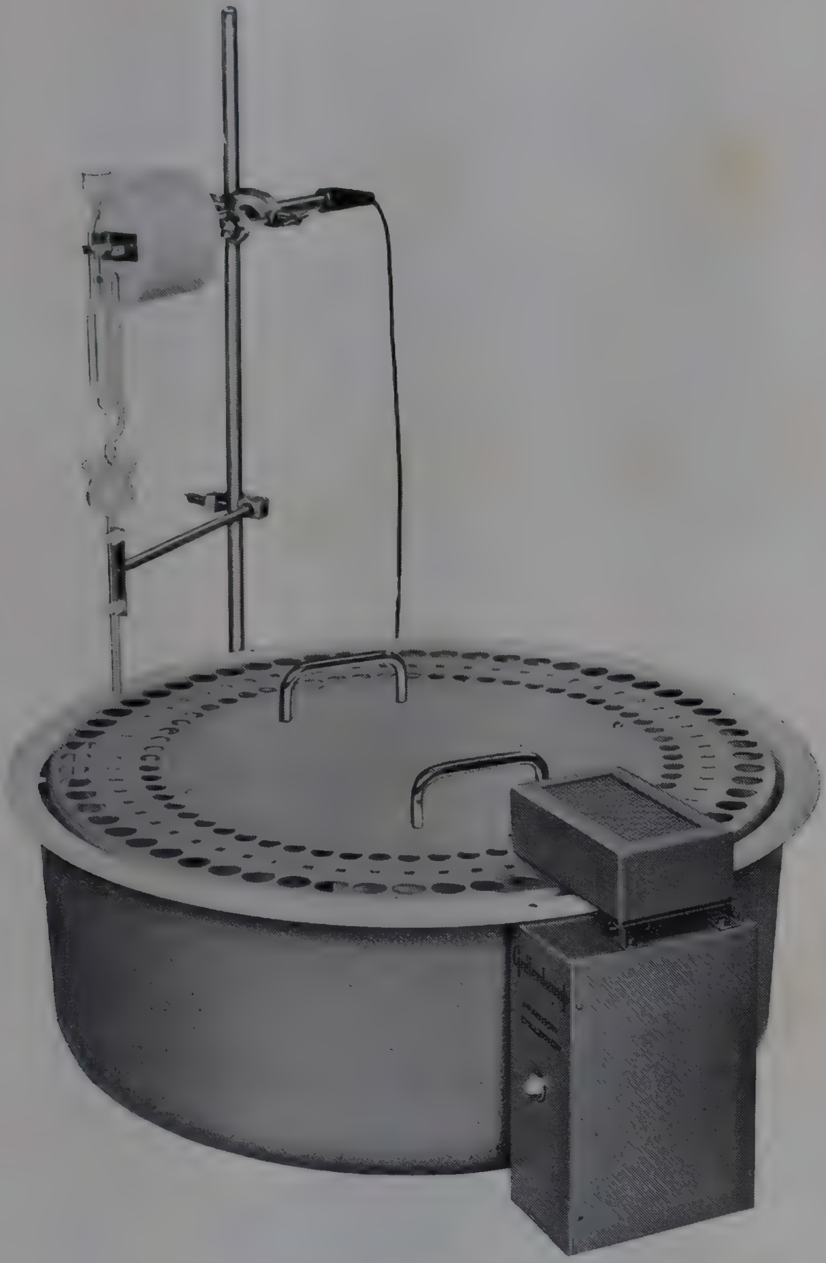
For full details of the above see entries in List No. sequence.

Gallenkamp
Junior
CF-405

All items on this page normally available from stock.

Gallenkamp

CHROMATOGRAPHY APPARATUS



CL-270

FRACTION COLLECTOR

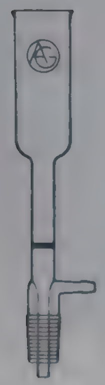
An inexpensive fraction collector which is especially appropriate to medical laboratory applications for two reasons.

Firstly, the fraction collecting point and the electrical drive mechanism are well apart and all electrical circuits are low voltage, thus rendering the apparatus as electrically safe as possible.

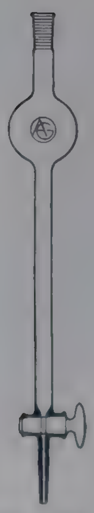
Secondly, timed cutting permits fractions to be collected *directly off the end of the chromatograpy column* where this is important to reduce the effects of 'tailing', e.g. with radioactive investigations.

- **Collector plate rotated by self-locating rim drive**
- **Self-standing collector plate for collecting up to 60 fractions in either 12 mm (½ in) or 19 mm (¾ in) dia. rimmed test tubes**
- **Swing-up drive arm allows collector plate to be loaded or removed in seconds**
- **Bowl construction with drain cock contains no mechanisms; provides large spillage capacity and protects tubes from damage**
- **Automatic arrest at end of track with facility for warning or stopping flow of eluent**
- **Fraction cutting by Siphon balance 1 to 25 ml**
  or
  Timer 1 to 45 min
- **Rigid plastics dome cover available as accessory**

For detailed specifications, prices and accessories see CL-270 et seq. in List No. sequence.



CL-130



CL-120

COLUMNS

For suction elution. A borosilicate glass column particularly suitable for separations of methylated oestrogens. Surmounted by a 40 ml reservoir and with a sintered disk, porosity 4, fused into the lower end to support the column packing. Int. dia. 10 mm, length 50 mm.

See CL-130 in List No. sequence.

For gravity elution. A range of borosilicate glass columns with diameters from 1 to 3 cm and lengths from 18 to 80 cm.

See CL-100 to CL-120 in List No. sequence.

For pressure elution. Two borosilicate glass jacketed columns. The columns have an effective length of 40 cm and are terminated by screw joints with ptfe inserts for connection to glass or metal tubing. Int. diameters 11·5 and 16·5 mm.

See CL-140 in List No. sequence.

DRYING CABINET

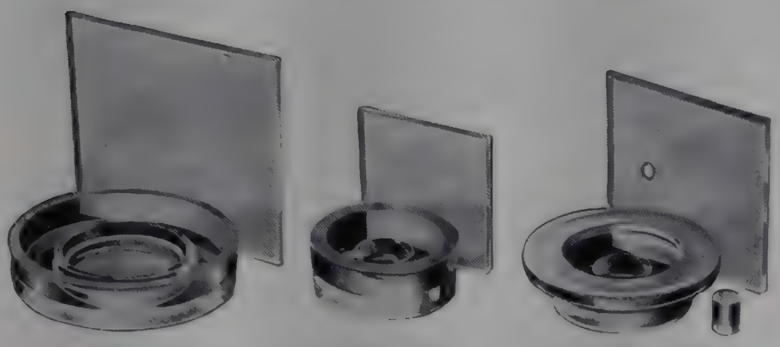
A large capacity cabinet with toughened glass doors for rapid controlled drying of chromatography sheets up to 58 × 68 cm. Optional exhaust fan for rapid removal of moisture and vapours. Maximum operating temperature 120°C.

See OV-880 in List No. sequence.

MICRODIFFUSION ANALYSIS

The apparatus described is used for the analysis by microdiffusion of a wide range of organic substances, particularly proteins, enzymes and other metabolic compounds. The technique depends upon the absorption of a volatile component of the sample by an absorbing fluid which is later titrated.

MICRODIFFUSION DISHES



MD-120 MD-125 MD-130

MD-120

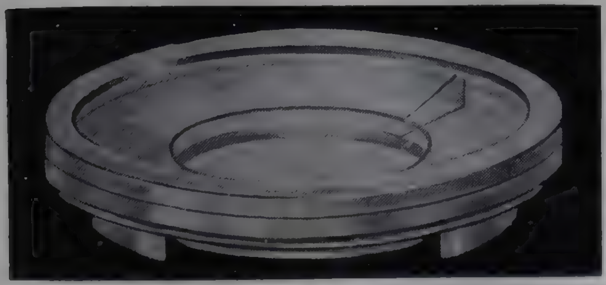
MICRODIFFUSION DISH, Conway No. 1. The original unit, 67 mm dia. with 70 mm square glass lid, for ammonia determinations in fluids from 0·0001 mg upwards and for determining a great variety of other substances in blood and body fluids. Ten **£3·00** Each **£0·36** *b*

MD-125

MICRODIFFUSION DISH, Conway No. 2. 44 mm dia. with 46 mm square glass lid, particularly suitable for determinations of blood sugar but may also be applied to many other determinations using smaller quantities than the No. 1 unit can handle. Ten **£4·00** Each **£0·46** *b*

MD-130

MICRODIFFUSION DISH, Conway No. 2A. 58 mm dia. with ground flange 8 mm wide. The 60 mm square lid has a 5 mm diameter hole drilled 17 mm from one side for adding reagent. With two 10 × 10 mm glass cylinders. For precise micro carbon dioxide and bicarbonate determinations, and for blood sugar and many other microdiffusion analyses ... Ten **£6·60** Each **£0·74** *b*

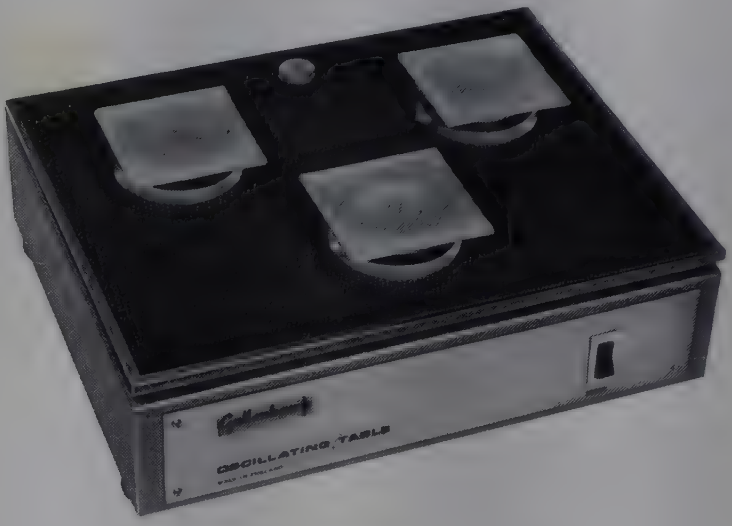


MD-140

***MD-140**

MICRODIFFUSION DISH, polystyrene, with drop-on lid. The dimensions of this semi-disposable unit have been designed to minimise the time taken for complete reaction. The material is sufficiently wettable not to require the use of a wetting agent. The thin, clear, colourless base makes the unit very suitable for absorptiometric techniques. Outside diam. 64 mm × max. internal depth 10 mm. ... 20 **£3·50** Each **£0·25** c

OSCILLATING TABLE



MD-160

OPERATION

The table comprises two glass plates, one supported above the other by three steel balls. When the uppermost plate, on which the dishes are placed, is deflected and released, it oscillates freely in all directions in the horizontal plane and slightly in the vertical plane. This produces the necessary agitation of the contents of up to twelve microdiffusion dishes.

CONSTRUCTION

The two glass plates each have three depressions in which the steel balls are centred. The lower plate is secured to a plinth which houses a small synchronous geared unit driven at 4 rev/min. An adjustable spring arm fixed to the gear unit periodically strikes a peg carried by the upper glass plate and thus sets the table in motion. The mechanism is completely silent and consumes only 6W. A combined ON/OFF switch and indicator lamp is mounted on the front panel. To prevent the dishes slipping off the table, the top plate is fitted with a rubber mat.

DIMENSIONS

Top plate	30 × 24 cm
Plinth	30 × 24 × 7·5 cm

MD-160

OSCILLATING TABLE, *Gallenkamp*, as specification. With spare steel balls. For single phase supplies.

For 200/250V 50 Hz ... ... Each **£35·00** *b*

For 100/130V 60 Hz ... ... Each **£36·00** *bN*

MICRO BURETTE

Recommended for use with microdiffusion dishes see BW-786 in List No. sequence.

Reference

'Microdiffusion Analysis and Volumetric Error' by Edward J. Conway, F.R.S., M.B., D.Sc.

Items on this page normally available from stock except those coded *N*.

Gallenkamp
COLONY COUNTER

CX-300

Gallenkamp
REGD TRADE MARK

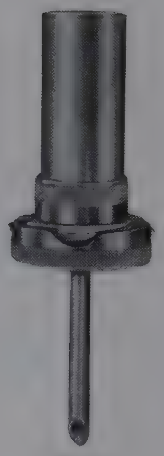
COLONY COUNTER

With transistorised digital counting circuit.

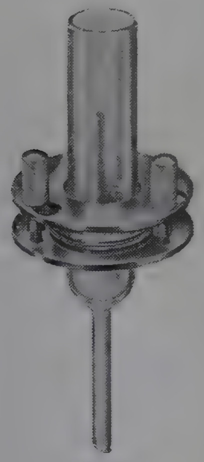
For accurately counting bacterial and mould colonies in biology, botany, zoology, bacteriology, pathology and public health investigations.

Strain-free viewing is provided by bright, dazzle-free peripheral illumination over light or dark background. Contact and ink marker probes are supplied and a push-button hand switch is optionally available. The coloured marker probes enable periodic increased growth checks to be made simply and without disturbing the colonies.

Full details of the colony counter and accessories—see CX-300 et seq. in List No. sequence.



FD-350



FD-440

Gallenkamp
REGD TRADE MARK

BACTERIOLOGICAL FILTER HOLDERS

For membrane filtration using 50 mm Oxoid membrane filters. Used in bacteriology, virology and mycology, and in testing clinical fluids including blood, urine, spinal fluids, and gastric and pleural washings.

In a typical bacteriological test the filter holder and membrane are sterilised. For each sample a fresh, sterile membrane is inserted into the holder and the sample is rapidly filtered by the application of suction or pressure. The membrane is then transferred to a Petri dish containing nutrient and incubated.

Also available, high pressure membrane filter holders, filter mat holders and a range of SINTERED GLASS FILTERS for bacteriological and tissue work and for gas washing and distribution.

See FD-350 et seq. in List No. sequence.

FH-500

Gallenkamp
REGD TRADE MARK

FLAME ANALYSER

For rapid, accurate determinations of sodium and potassium in serum, plasma, urine and other fluids, and in plant and animal tissues.

- Accurate readings in 5 seconds.
- Sodium 2 ppm full scale.
- Potassium 5 ppm full scale.
- Immediate operation—no warm up period.
- Operates on town gas and most commercial gases.
- Simple to operate and maintain.

Accuracy—about 1% full scale; better with the mean of several readings.

Samples—only 0·5 ml per reading; uptake rate 4 ml/min.

Breakthrough—normally less than 5% breakthrough from a 100-fold excess of interfering cation.

Available with optional interference filter for calcium—fits into the flick-change turret.

See FH-500 et seq. in List No. sequence.

HAEMACYTOMETERS

MD-200

HAEMACYTOMETER, to BS 748, with **rhodium coated** counting chamber giving bright lines against a neutral grey background. Double cell chamber with improved Neubauer ruling where the cell depth over the ruled areas is 0·1 ±0·001 mm. With plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in aluminium alloy case ... Each **£6·50** *m*

MD-206

HAEMACYTOMETER, to BS 748, as MD-200 but with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Each **£6·50** *m*

REPLACEMENT PARTS

MD-210 **Counting chamber, rhodium coated,** with improved Neubauer ruling, complete with cover glasses. Each **£4·40** *m*

MD-216 **Counting chamber, rhodium coated,** with modified Fuchs-Rosenthal ruling, complete with cover glasses. Each **£4·40** *m*

Pipettes and cover glasses, see below.

MD-200

MD-220

HAEMACYTOMETER, to BS 748, comprising a BS single cell counting chamber with improved Neubauer ruling, with chamber depth 0·1 ±0·001 mm. Two plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in fitted case. Each **£5·00** *m*

MD-226

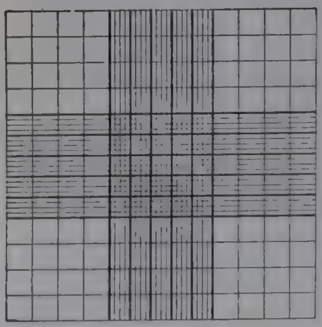
HAEMACYTOMETER, to BS 748, as MD-220, but with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Each **£5·00** *m*

MD-230

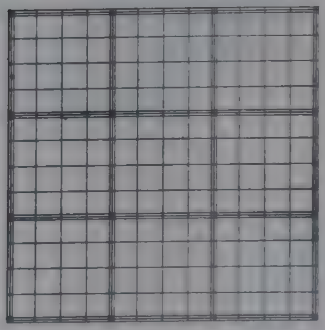
HAEMACYTOMETER, to BS 748, comprising a BS double cell counting chamber with improved Neubauer ruling, two plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in fitted case ... ... Each **£6·00** *m*

MD-236

HAEMACYTOMETER, as MD-230, but with modified Fuchs-Rosenthal ruling and two white cell pipettes. Each **£6·00** *m*



Improved Neubauer Ruling



Modified Fuchs-Rosenthal Ruling

REPLACEMENT PARTS

Counting chambers, complete with cover glasses.

Type	Single			Double		
List No.	Ruling	Each	List No.	Ruling	Each	
		£			£	
MD-250	Improved Neubauer	2·50	**MD-260**	Improved Neubauer	3·60	*m*
MD-256	Modified Fuchs-Rosenthal	2·50	**MD-266**	Modified Fuchs-Rosenthal	3·60	*m*

ME-386 **Pipette,** red cell, giving dilution 1 in 100 ... ...

ME-388 **Pipette,** white cell, giving dilution 1 in 10... ... ...

} **For prices see entries in List No. sequence.**

MD-274 **Cover glasses,** optically plane, for single cell counting chamber. Dimensions 16 × 22 mm, thickness 0·4 mm ... ... Pack of 10 **£1·10** *m*

MD-276 **Cover glasses,** optically plane, for double cell counting chamber. Dimensions 22 × 25 mm, thickness 0·4 mm ... ... Pack of 10 **£1·10** *m*

MD-320

COUNTING CHAMBER, Helber, circular cell with depth of 0·02 mm, with Thoma ruling. Slide thickness 1 mm ... ... Each **£4·00** *m*

All items on this page normally available from stock.

IH-100

Gallenkamp
REGD TRADE MARK

ANHYDRIC INCUBATORS

General purpose incubators with accurate temperature control, for culture growth in the fields of biology and microbiology, bacteriology, virology and epidemiology, pathology and biochemistry.

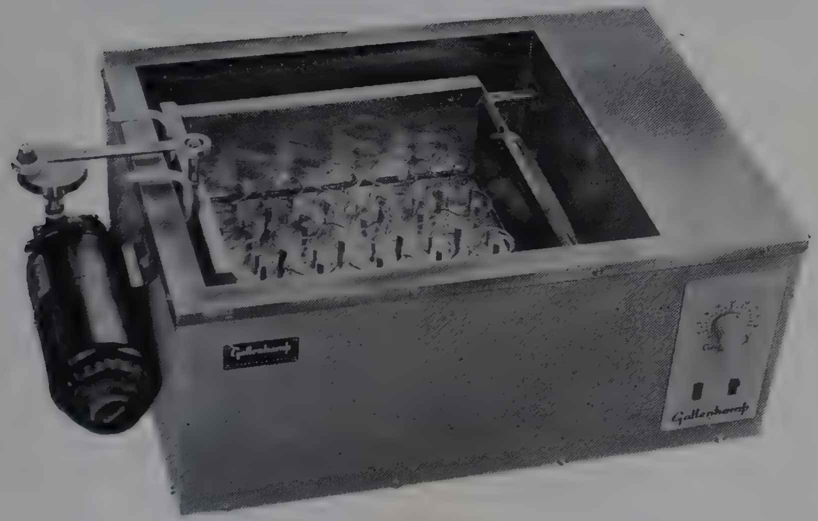
- Accurate temperature control.
- Uniform temperature throughout work space.
- Controlled ventilation.

Available in three popular sizes.

See IH-100 in List No. sequence.

The Incubators Section includes other well known apparatus such as the **Economy Incubator** and **Cooled Incubator** (0° to 45°C).

Full details—see IH-150 et seq. in List No. sequence.



IH-350

Gallenkamp
REGD TRADE MARK

SHAKING INCUBATORS

For growing cultures of micro-organisms and tissue cells under controlled conditions of temperature and agitation.

SHAKING INCUBATOR (WATER BATH)

- Temperatures up to 80°C (control 0·1degC).
- Speed variable from 50 to 200 oscillations/min.
- Interchangeable racks.
- Provision for anaerobic working.

Typical load—50 × 25 ml conical flasks.

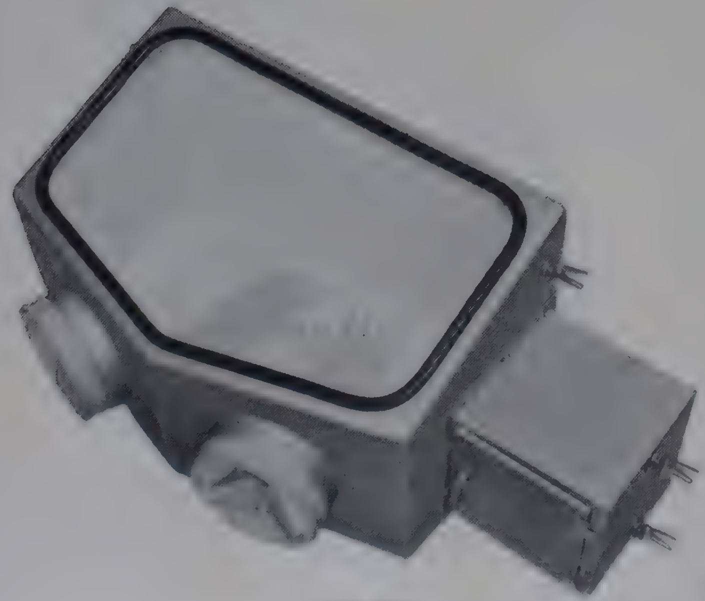
ORBITAL INCUBATOR (AIR BATH)

- Temperatures up to 50°C (control 0·1degC).
- Speed variable from 30 to 280 orbits/min.
- Interchangeable racks.
- For use with air and other atmospheres.

Typical load—36 × 250 ml conical flasks.

Both of these machines incorporate robust, heavy mechanisms, enabling prolonged tests to be carried out.

Full details—see IH-350 to IH-450 in List No. sequence.



MA-950

Gallenkamp
REGD TRADE MARK

MANIPULATOR GLOVE BOX

With automatic air-lock loading hatch.

This manipulator glove box has many applications in medical fields. Toxic materials may be handled (ground, stirred, filtered, gently heated, etc.) without danger from airborne particles; hygroscopic substances can be handled without difficulty and operations where it is necessary to exclude air, or work under dust free conditions, are possible with the apparatus. Low radioactive isotopes can be handled with safety. In work involving bacteria, viruses, biological or pathological specimens and so on, it makes possible protection of the specimen from the operator and vice versa. The loading hatch is in the form of an automatic air-lock with two airtight doors interconnected by a neat interlocking system to prevent either being opened until the other is correctly shut.

See MA-950 et seq. in List No. sequence.

Also available:

Pathological Manipulator Cabinet with built-in exhaust fan—see MA-980.

Clean Air Cabinet—see MA-990.

Technico

REGD. TRADE MARK

SELIGSON AUTOMATIC DILUTION PIPETTES

For the rapid, quantitative dilution of liquid samples in routine analytical and clinical work.

- **Three models cover dilution ranges 1 : 5 to 1 : 250**
- **Self rinsing action; no cleaning required between successive samples**
- **Auto zero burette for diluent volume**

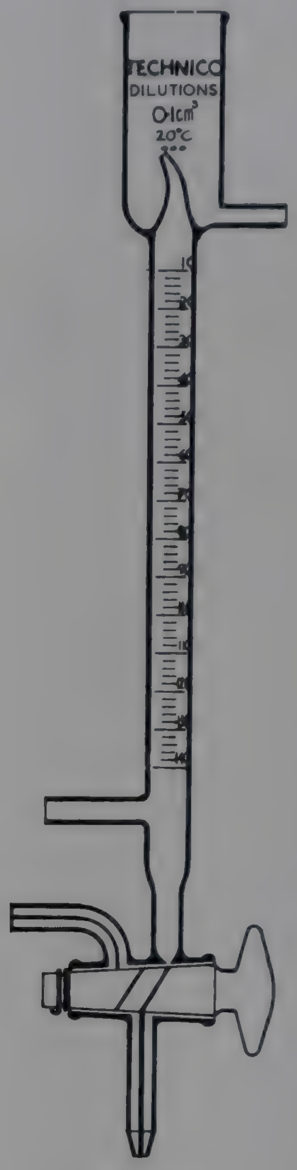
OPERATION

The precisely calibrated jet of the dilutor is filled with sample by opening the stopcock to the capillary side tube and applying gentle suction. The burette is filled with diluent through the filling tube until excess flows from the top tube and is drained away. By rotating the stopcock through half a turn, the diluent discharges through the jet, washing out with it the sample. The dilution ratio is measured directly on the burette scale. Rotating the stopcock yet once more, the next sample may be drawn into the rinsed jet ready for dilution, and so on.

ME-230

PIPETTES, Seligson dilution, *Technico*, as specification, borosilicate glass.

Jet capacity		0·05	0·1	0·2cm^3	
Dilution	from	1:20	1:10	1:5	
	to	1:250	1:140	1:70	
Subdivided		5	2	1 cm^3	
Dozen		**£40·00**	**40·00**	**44·00**	*aS*
Each		**£ 3·80**	**3·80**	**4·20**	



ME-230

PIPETTES, automatic dispensing, see PM-664 to PM-765 in List No. sequence.

AUTOMATIC DILUTERS

A series of self-contained instruments capable of performing rapid dilution of liquid samples with a reproducibility within ±1%.
The instruments use a motorised glass ptfe diluent syringe and a Delrin sample syringe. Sample and diluent are discharged in turn through the delivery tube and in this way each sample is followed by a relatively large volume of diluent which washes the delivery tube.

NOTE: Delrin is an acetal resin which has excellent chemical resistance to organic solvents but is not resistant to concentrated acids, bases or oxidising agents.

ME-242

LIQUID DILUTER, automatic, *Auto-Diluter*, as specification with glass/ptfe diluent syringe and Delrin valve and sample syringe. A press button for single cycle operation and an adapter for connecting a foot switch are provided. The inlet nozzle requires 3 mm bore thin wall tubing and a length of polythene tubing is supplied for the outlet nozzle. Complete with instructions. Overall dimensions 25 × 10 × 12 cm.

For 220/240V 50 Hz single phase supplies.

Diluent syringe capacity	5	5 cm^3	
Sample syringe range	0·02 to 0·1	0·1 to 0·2 cm^3	
Deliveries per minute	5	5	
Each	**£43·45**	**43·45**	*f*

ME-244

LIQUID DILUTER, automatic, *Auto-Diluter*, as ME-242 but capable of handling larger volumes of diluent. For 220/240V 50 Hz single phase supplies.

Diluent syringe capacity	10	10 cm^3	
Sample syringe range	0·02 to 0·1	0·1 to 0·2 cm^3	
Deliveries per minute	10	10	
Each	**£57·75**	**57·75**	*f*

REPLACEMENT PARTS AND ACCESSORIES

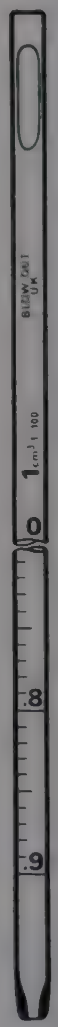
PM-766	**Foot switch assembly**	**For prices see entries in List No. sequence.**
PM-769	**Syringes, glass, 5 and 10 cm^3 for diluent**	
TX-772	**Tubing, PVC, 3 mm bore**	

AUTO - DILUTER
OUTLET
INLET

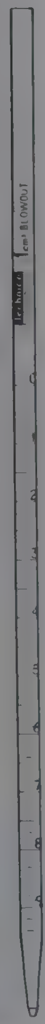
ME-242
ME-244

Items on this page coded S normally available from stock.

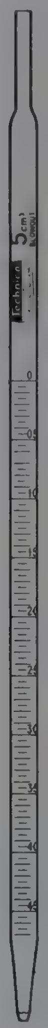
PIPETTES



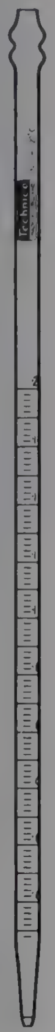
ME-250



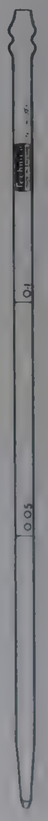
ME-260



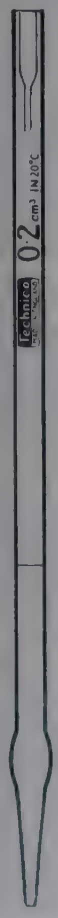
ME-262



ME-270



ME-292



ME-300

FOR SEROLOGICAL PURPOSES

ME-250

PIPETTES, serological, disposable, soda-lime glass. Capacity 1 cm^3 subdivided 0·01 cm^3. Accurate to within $\pm 2\%$, flow time approximately 2 seconds. Sterilised during manufacture in dry steam at 134°C for 30 minutes. Supplied cotton plugged in pack containing 250 pipettes and one rubber teat. Each pipette is intended to be used once only ... ...

20 packs	£105·00	m
10 packs	£55·00	
Pack	£6·00	

ME-260

PIPETTES, serological, *Technico,* with fast jet calibrated to tip for blow-out of last drop.

To deliver	0·1	0·2	1	1	2 cm^3	
Subdivided in	0·01	0·01	0·01	0·1	0·02 cm^3	
Flow time	3–5	3–5	4–8	4–8	4–8 sec	
Dozen	£4·50	4·80	2·70	3·00	2·45	a
Three	£1·20	1·30	0·72	0·80	0·66	
Each	£0·43	0·46	0·29	0·32	0·27	

ME-262

PIPETTES, serological, *Technico,* as ME-260 but with reduced diameter suction stem above the top mark.

To deliver	5	5	10 cm^3	
Subdivided in	0·05	0·1	0·1 cm^3	
Flow time	4–8	4–8	6–10 sec	
Dozen	£2·45	2·85	2·85	a
Three	£0·66	0·76	0·76	
Each	£0·27	0·30	0·30	

ME-350

PIPETTES, serological, *Corex,* strengthened glass. See entry in List No. sequence.

ME-270

PIPETTES, blood and opsonic index, *Technico,* with white enamel back and nipple fitting for rubber teat. Calibrated to contain an accurate volume of blood which must be completely washed out in use.

To contain	0·05	0·1	0·2	0·5	1 cm^3	
Subdivided in	0·0005	0·001	0·002	0·005	0·01 cm^3	
Dozen	£4·40	4·40	4·40	4·40	4·40	a
Three	£1·18	1·18	1·18	1·18	1·18	
Each	£0·43	0·43	0·43	0·43	0·43	

ME-292

PIPETTES, blood sugar, *Technico,* graduated with two marks to contain, with white enamel back and nipple fitting for rubber teat.

To contain	0·1	0·2 cm^3	
Subdivided at	0·05	0·1 cm^3	
Dozen	£4·20	4·20	a
Three	£1·12	1·12	
Each	£0·41	0·41	

ME-300

PIPETTE, Maclean, *Technico,* for blood sugar, with white enamel back, graduated to contain 0·2 cm^3.

Dozen £4·80 Three £1·30 Each £0·46 a

All items on this page normally available from stock.

PIPETTES

ME-320

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* calibrated to contain.

To contain	0·2	0·5	1	2 cm³	
Dozen	**£5·00**	**5·00**	**5·10**	**5·90**	*a*
Each	**£0·47**	**0·47**	**0·48**	**0·55**	

ME-330

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* calibrated to tip for blow out of last drop.

To deliver	0·2	0·5	1	2 cm³	
Dozen	**£5·00**	**5·00**	**5·10**	**5·90**	*a*
Each	**£0·47**	**0·47**	**0·48**	**0·55**	

***ME-375**

PIPETTES, Ostwald-Folin, *Corex,* strengthened glass, see entry in List No. sequence.

ME-340

PIPETTES, Ostwald-Van Slyke, *Technico,* to deliver between two graduations, the lower mark being high enough to permit reading when pipette is inserted into the reaction pipette cup of a Van Slyke apparatus.

To deliver	0·2	0·5	1	2 cm³	
Dozen	**£7·80**	**8·00**	**8·20**	**8·40**	*a*
Each	**£0·72**	**0·74**	**0·76**	**0·78**	

ME-342

PIPETTES, Ostwald-Van Slyke, *Technico,* as ME-340 but with stopcock.

To deliver	0·2	0·5	1	2 cm³	
Dozen	**£12·00**	**12·20**	**12·60**	**13·40**	*a*
Each	**£ 1·12**	**1·14**	**1·18**	**1·25**	

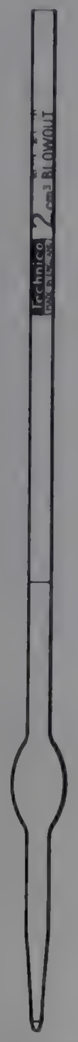
PIPETTE, Ostwald-Van Slyke, three mark, opal backed, *Technico,* for use with the Van Slyke apparatus. Graduated to deliver 0·05 or 0·1 cm³ between marks, the lowest mark is high enough to permit the reading to be made when the pipette is inserted into a reaction pipette. The waste volume is kept to a minimum by the use of fine bore capillary tubing below the lower mark.

ME-344

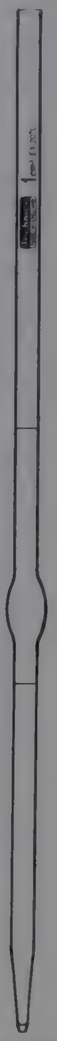
PIPETTE, Ostwald-Van Slyke, *Technico,* **without stopcock** ... ... Dozen **£11·20** Each **£1·04** *a*

ME-346

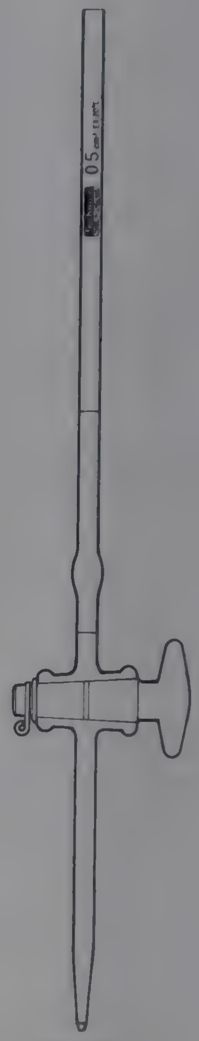
PIPETTE, Ostwald-Van Slyke, *Technico,* **with stopcock** ... ... Dozen **£17·00** Each **£1·60** *a*



ME-320
ME-330



ME-340



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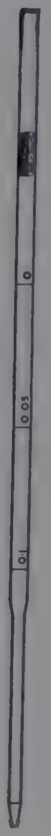


ME-344

ULTRASONIC CLEANERS

For the efficient, high speed cleaning of laboratory glassware including pipettes.

- **Stainless steel tanks**
- **Tank capacities up to approximately 15 litres**

For details see entries under page heading ULTRASONICS.

All items on this page normally available from stock.

COREX® PIPETTES

Manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the Corning U.S.A. trademark for laboratory glassware made from a special type of glass and treated by a chemcor ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

It has much greater surface hardness than ordinary glass and is so better able to resist the scratching and chipping which weaken ordinary glass and are a major cause of breakage, as well as constituting a danger from cross-contamination.

Corex is far more resistant to chemical attack than ordinary borosilicate, will withstand repeated steam sterilisation without visible clouding, and can be used up to 300°C without damage.

Corex pipettes are manufactured to a very high quality to American specifications which are on the whole very similar to the corresponding British Standards although there are some differences in sizes and a number of minor differences in dimensions and volumetric tolerances. In accordance with American practice, pipettes to class A accuracy are so designated, it being understood that other pipettes without designation are class B accuracy. The limit of error applicable to each pipette is shown so that the purchaser can compare with the corresponding British Standard if desired. Graduations and inscriptions are as permanent as the glass itself and will remain sharply legible throughout the whole life of the pipettes.

Gallenkamp is the appointed Distributor of Corex laboratory glassware in the United Kingdom.

***ME-350**

PIPETTES, short tip serological, *Corex* 7085A, with permanently marked graduations from zero line at top down to full capacity at tip of jet.

To deliver	0·1	0·2	1	1 cm^3	
Subdivided	0·01	0·01	0·1	0·01 cm^3	
Limit of error	0·005	0·008	0·02	0·02 cm^3	
12	**£11·00**	**12·00**	**10·50**	**12·00**	*d*
Each	**£ 1·04**	**1·12**	**0·98**	**1·12**	
To deliver	2	2	5	10 cm^3	
Subdivided	0·1	0·01	0·1	0·1 cm^3	
Limit of error	0·02	0·02	0·04	0·06 cm^3	
12	**£12·00**	**15·50**	**12·00**	**13·50**	*d*
Each	**£ 1·12**	**1·45**	**1·12**	**1·25**	

***ME-352**

PIPETTES, serological, cotton plug, *Corex* 7086A, with permanently marked graduations from zero line at top down to full capacity at tip of jet.

To deliver	0·1	0·2	1	1 cm^3	
Subdivided	0·01	0·01	0·1	0·01 cm^3	
Limit of error	0·005	0·008	0·02	0·02 cm^3	
12	**£12·75**	**13·25**	**10·50**	**12·00**	*d*
Each	**£ 1·20**	**1·25**	**0·98**	**1·12**	
To deliver	2	2	5	10 cm^3	
Subdivided	0·1	0·01	0·1	0·1 cm^3	
Limit of error	0·02	0·02	0·04	0·06 cm^3	
12	**£12·25**	**17·00**	**12·00**	**13·50**	*d*
Each	**£ 1·14**	**1·60**	**1·12**	**1·25**	

***ME-365**

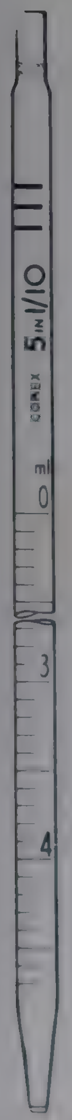
PIPETTES, serological, V.D.R.L., *Corex* 7093A, with permanently marked graduations. Short 20 cm pipettes for performing V.D.R.L. tests for syphilis and other tests using spot plate and ring agglutination slides. For delivery from zero line at top down to full capacity at tip of jet.

To deliver	0·5	0·5 cm^3	
Subdivided	0·01	0·05 cm^3	
Limit of error	0·01	0·01 cm^3	
12	**£14·50**	**13·00**	*d*
Each	**£ 1·35**	**1·20**	

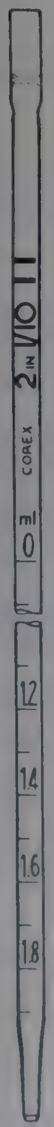
***ME-375**

PIPETTES, Ostwald-Folin, Class A, *Corex* 7105A, with permanently marked graduations.

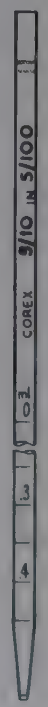
To deliver	0·5	1	2 cm^3	
Limit of error	0·006	0·006	0·006 cm^3	
12	**£13·75**	**13·75**	**13·75**	*d*
Each	**£ 1·30**	**1·30**	**1·30**	



ME-350



ME-352



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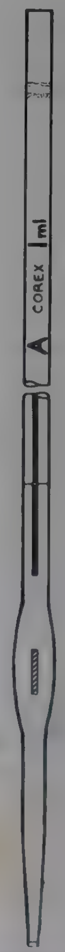


ME-375

COREX PIPETTES

Bulb (transfer)	see	PM-460
Long tip	see	PM-430
Mohr type	see	PM-435

For details and prices see entries in List No. sequence

All items on this page normally available from stock.

PIPETTES

ME-380

PIPETTE, DROPPING, Dreyer, with capillary tip and rubber teat. ... Dozen **£4·20** Each **£0·41** *a*

RV-220 Teats, 0·8 ml capacity, spare for above, see entry in list No. sequence.

ME-386

PIPETTE, haemacytometer, to BS 748. For red cells, giving dilution 1 in 100. Complete with mouthpiece and tubing ... ... Ten **£6·90** Each **£0·76** *m*

ME-388

PIPETTE, haemacytometer, to BS 748. For white cells, giving dilution 1 in 10. Complete with mouthpiece and tubing ... ... Ten **£6·90** Each **£0·76** *m*

ME-390

PIPETTE, haemoglobinometer, with mouthpiece and rubber tubing. Capacity 20 mm^3.
Ten **£3·10** Each **£0·37** *m*

ME-400

PIPETTES, Kahn, *Technico,* calibrated to tip for blowout of last drop. Overall length 350 mm.

To deliver	0·2	0·25	0·45	1·5 cm^3	
Subdivided in	0·001	0·0125	0·15	0·05 cm^3	
Dozen	**£5·40**	**4·90**	**5·20**	**4·90**	*a*
Each	**£0·50**	**0·46**	**0·49**	**0·46**	

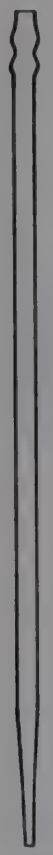
ME-430

PIPETTES, Warburg, *Technico,* graduated with extra long jets, for use with Warburg flasks.

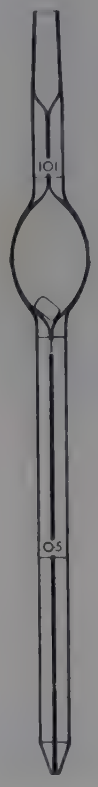
Capacity	0·1	0·2	0·5	1 cm^3	
Subdivided in	0·001	0·002	0·005	0·01 cm^3	
Dozen	**£5·20**	**5·20**	**4·90**	**4·70**	*a*
Each	**£0·49**	**0·49**	**0·46**	**0·45**	

ME-436

PIPETTES, 0·02 ml, disposable. Precision break-off capillary tubes for accurate dilutions. In pack of 1000. Ref: Lewis & Benjamin, J. Clin. Path. (1965), **18,** 689.
Pack **£12·00** *m*



ME-380



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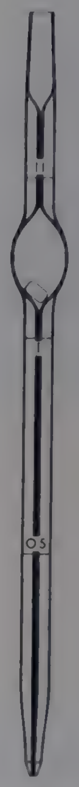

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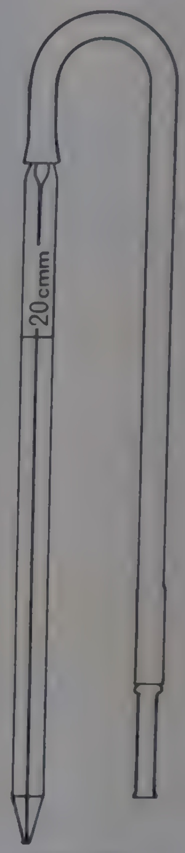


ME-390

DISPOSABLE DOSING PIPETTES

These capillary Pasteur pipettes enable blood, serum and other biological fluids to be transferred under sterile conditions. They have a constriction in the neck to act as a stop for the cotton wool plug, and to facilitate their being carried horizontally when filled. Being machine made and uniform, they have a virtually reproducible volume per drop.

ME-440

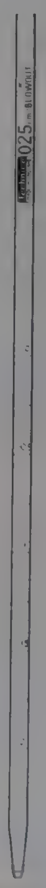
DOSING PIPETTE, uncalibrated, short form, length 5¾ in (14·5 cm). Approx. 30 drops per ml. In boxes of 250.

20 boxes	**£38·00**	*m*
4 boxes	**£8·00**	
Box	**£2·20**	

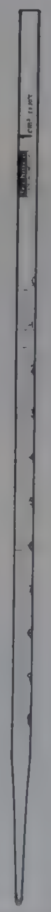
ME-442

DOSING PIPETTE, uncalibrated, long form, length 9 in (22·5 cm). Approx. 33 drops per ml. In boxes of 250.

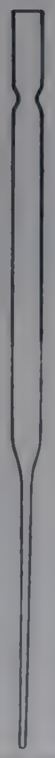
20 boxes	**£42·00**	*m*
4 boxes	**£9·00**	
Box	**£2·40**	



ME-400



ME-430



ME-440

Hempel-Van Slyke pipette see MC-521 in List No. sequence.

Plates for agglutination, blood grouping and other tests see **PLATES.**

All items on this page normally available from stock.

OV-010

Gallenkamp

OVEN/STERILISERS

- Excellent temperature control—efficient insulation.
- Modern appearance with built-in controls.
- Long-life heaters.
- All-steel parts rustproofed or stainless.

HOTBOX ovens with extra large shelves to accommodate pipette sterilising boxes.

ECONOMY ovens available with toughened plate glass door, provides reasonable performance at economical price.

BS ovens for use where high performance standards are required within the specification of BS 2648.

Also forced air DRYING CABINET, HEAVY DUTY OVENS, etc. See OV-010 et seq. in List No. sequence.

EJ-930

Gallenkamp

POTENTIOMETRIC MICROTITRATION APPARATUS

For the multiple, routine determination of chloride ion in plasma, serum, CSF, urine and other biological fluids, and for the determination of salinity.

Designed in cooperation with Professor I. D. P. Wootton, Ph.D., M.A., M.B., B.Chir., F.R.I.C.

- Only 0·2 ml sample used.
- Results in mE/litre.
- 1% routine accuracy.
- Requires only two standard solutions—no indicators.
- Rapid and convenient in use.

See EJ-930 et seq. in List No. sequence.

Also available general purpose electrochemical TITRATION STAND with magnetic stirrer base and combined burette and electrode holder for most electrodes—see EJ-920 et seq.

GC-414

Gallenkamp

RESPIRATORY GAS ANALYSERS

LLOYD GAS ANALYSER

The Lloyd Gas Analyser incorporates many advanced design features and, unlike traditional absorption apparatus, is both portable and very accurate. A complete O_2/CO_2 analysis can be performed in five minutes to an accuracy of 0·02% total volume.

Virtually all potential errors are eliminated including those due to faulty manipulation, leaky joints, and changes in ambient pressures and temperatures.

The apparatus is ideal for multiple routine determinations and accessory pipettes are available for a range of gas component determinations by techniques including combustion.

Suitable for O_2, CO_2, CO, CH_4, H_2, C_2H_2, N_2O and other unsaturated gases.

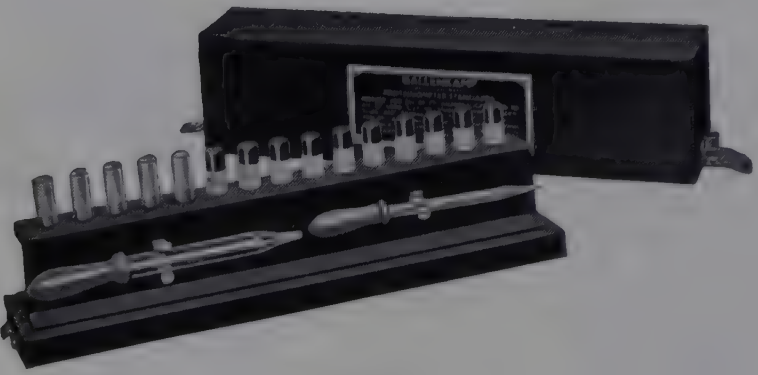
See GC-400 et seq. in List No. sequence.

Also available, a range of Orsat Gas Analysers and accessories—see GC-020 et seq. and Haldane Gas Analysers—see GC-300 et seq. in List No. sequence.

Gallenkamp PROTEINOMETER STANDARDS

ME-450

PROTEINOMETER STANDARDS SET, *Gallenkamp*, for the turbidimetric estimation of albumen in urine, CSF and other body fluids. Comprises 10 sealed and labelled albumen standards covering the range 10 to 100 mg/100 ml and 5 sample tubes. These tubes of 1 cm internal diameter are mounted in a comparator block which has an anodised aluminium plate with a central black band running the whole length of the plate to aid the visual comparison of sample and standard. Supplied with one 1 ml and one 3 ml dropping pipette attached to the wooden block by spring clips, and cover with anodised instruction plate.
Without sulpho-salicylic acid ... Each **£7·00** *b*


ME-450

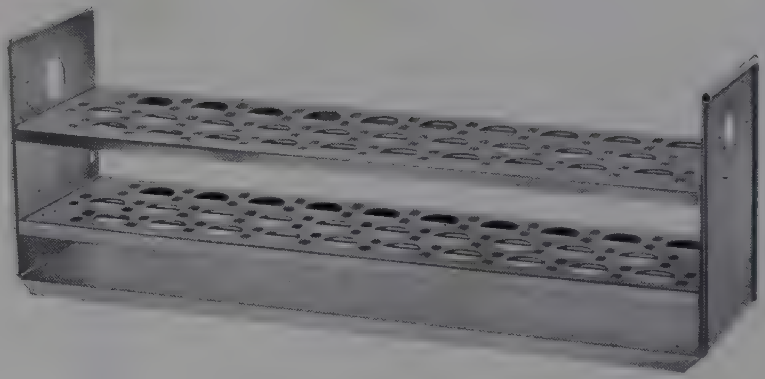
REPLACEMENT PART
ME-452 **Tubes,** sample, for above. In pack of 10.
10 packs **£3·10** Pack **£0·37** c

Reference: E. J. King and H. Wiggins, 2nd International Congress of Biochemistry, Paris, 1952, Resumé de Communications, p. 352.

KAHN RACK

ME-482

KAHN RACK, stainless steel, with 30 holes 14 mm dia. to take Kahn or culture tubes which are held in position by wire springs. These racks may be used in shaking machines for Kahn tests or vertically in incubators with culture tubes. Dimensions 7·5 × 27·5 × 10 cm high.
Ten **£25·00** Each **£2·75** *b*


ME-482

TF-104

TUBE, for **Kahn test,** soda-lime glass, 75×12 mm, see entry in List No. sequence.

Kahn rack shaker see SD-130 in List No. sequence.

Gallenkamp FLASK SHAKER

Suitable for dissolving, dispersing, extracting and many other applications.

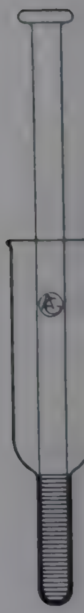
Capable of shaking a balanced load of 500 ml flasks, each not more than half full of liquid, at speeds up to 800 oscillations per minute.

- **Accepts up to six 500 ml flasks**
- **Controlled speed range up to 800 oscillations per minute**
- **Integral timer, range 0 to 20 minutes, with position for prolonged shaking**

Gallenkamp
FLASK SHAKER
SD-110 with flasks

For detailed specification and price see SD-110 in List No. sequence.

All items on this page normally available from stock.



ME-550

ME-560

TISSUE GRINDERS

ME-550

TISSUE GRINDERS, (Homogenisers) (AG), comprising glass cup with projecting tube and glass plunger. Cup and plunger are ground internally and externally respectively and there is a very small clearance at the sides and end when fitted together.

Overall length approx.	180	225 mm	
Ground zone, length approx.	40	50 mm	
Ground zone, diameter approx.	7	11 mm	
Ten	**£14·60**	**21·50**	*a*
Each	**£ 1·60**	**2·40**	

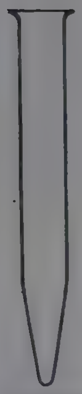
Q-BC15P with Q-BC15/150

HOMOGENISER, *Quickfit*, see entry under QUICKFIT APPARATUS.

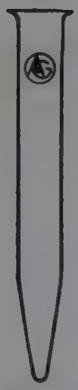
ME-560

TISSUE GRINDER, to take about 50 ml. Comprises a tubular body closed at one end by a perforated plate and a piston. The piston, propelled by a screw, forces the contents through the perforations into the path of revolving knife ... ... Each **£18·15** *mN*

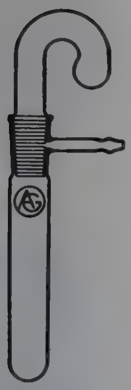
MIXERS, EMULSIFIERS AND HOMOGENISERS for blending, liquefying, grinding, disintegrating and emulsifying small quantities of material—see MU-900 et seq.



TF-104
TF-128



TF-123



ME-630

TUBES

TF-104

TUBE, for Kahn test, soda-lime glass, with round bottom. Length 75 mm, int. dia. 10 mm, ext. dia. 12 mm. For price see entry in List No. sequence.

TF-123

TUBE, AGGLUTINATION, Dreyer, BS 625 with conical bottom. 60×7 mm. For price see entry in List No. sequence.

TF-128

TUBES, neutral resistance glass, bacteriological grade. For details and prices see entry in List No. sequence.

ME-630

TUBE, Thunberg, Keilin, (AG), modification with hollow stopper for addition of reagent. Capacity 10 ml. Each **£1·10** *a*

Thunberg tubes see also **QUICKFIT APPARATUS.**

ME-650

SAMPLE CONTAINERS

ME-650

CARTON, plastics, with press-on cap. For collecting samples for TB tests. Capacity 150 ml approximately. In pack of 100... ... ... Pack **£1·40** c

OTHER SAMPLE CONTAINERS will be found under headings **BOTTLES, CULTURE, JARS** and **TUBES** in alphabetical sequence in the catalogue.

Items on this page normally available from stock except those coded *N*.

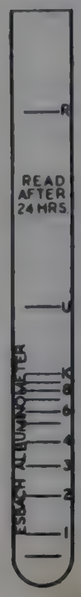
URINE TESTING

ME-700

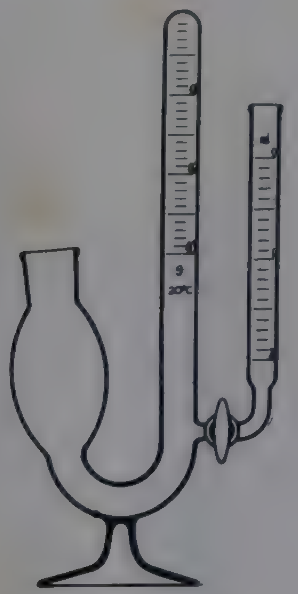
ALBUMINOMETER, Esbach, for estimating the amount of albumen in urine. With bold graduations.
Ten £1·00 Each £0·17 c

ME-715

UREOMETER, Doremus-Hind, for the estimation of urea in urine by the hypobromite method. From the side tube, which is graduated from 0 to 2 cm³ in 0·1 cm³, urine is transferred to the closed vertical tube where it reacts with a solution of sodium hypobromite. Nitrogen is liberated and measured in the closed tube which is directly calibrated both to 0·03g urea/100 cm³ urine in 0·001g divisions and to 0·5 grains urea/100 cm³ urine in 0·01 gr divisions. Mounted on a glass foot ... Each £2·70 c



ME-700



ME-715

UREOMETER, Maclean, for the estimation of urea by the hypobromite method. Comprises bottle with mark at 25 cm³, test tube with mark at 5 cm³ and a 50 cm³ gas burette subdivided in 0·1 cm³ fitted with stopcock and side tube.

Reference: Practical Clinical Biochemistry by H. Varley. 1963.

List No.	Component	Ten	Each	
		£	£	
ME-720	Bottle	1·45	0·21	a
ME-722	Test tube	1·20	0·19	a
ME-724	Burette	10·40	1·14	a
MF-920	Reservoir	See entry in List No. sequence.		

ME-740

URINE TEST GLASSES, conical shape, with spout.

Capacity	125	200	300 ml	
Ten	£2·70	3·20	4·00	c
Each	£0·33	0·38	0·45	

WASHING AND DRYING

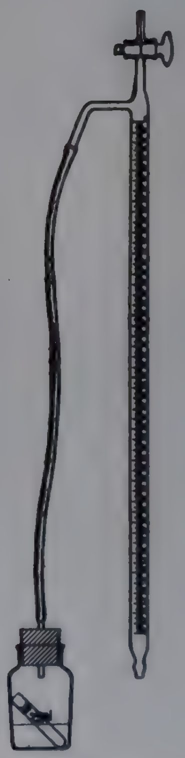
Bottle washers	see **WD-020/050**
Cleaning liquids	see **CM-742 et seq.**
Pipette washers	see **WD-120 and UL-150**
Ultrasonic cleaners	see **UL-150 et seq.**
Draining racks	see **WD-170/174**
Drying cabinet, *Gallenkamp*	see **OV-880**
Drying cabinet	see **WD-195**
Drying cloths	see **CM-510 et seq.**
Glassware dryers, *Gallenkamp*	see **WD-200/215**

For details and prices see entries in List No. sequence.

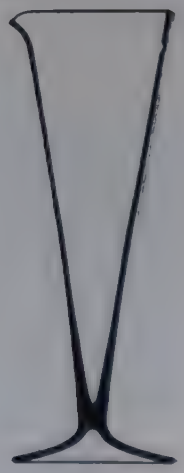
WASTE DISPOSAL

WASTE BINS	see **WD-400/425**
WASTE SACKS and HOLDERS	see **WD-440 et seq.**

For details and prices see entries in List No. sequence.



Assembly of
ME-720, ME-722, ME-724

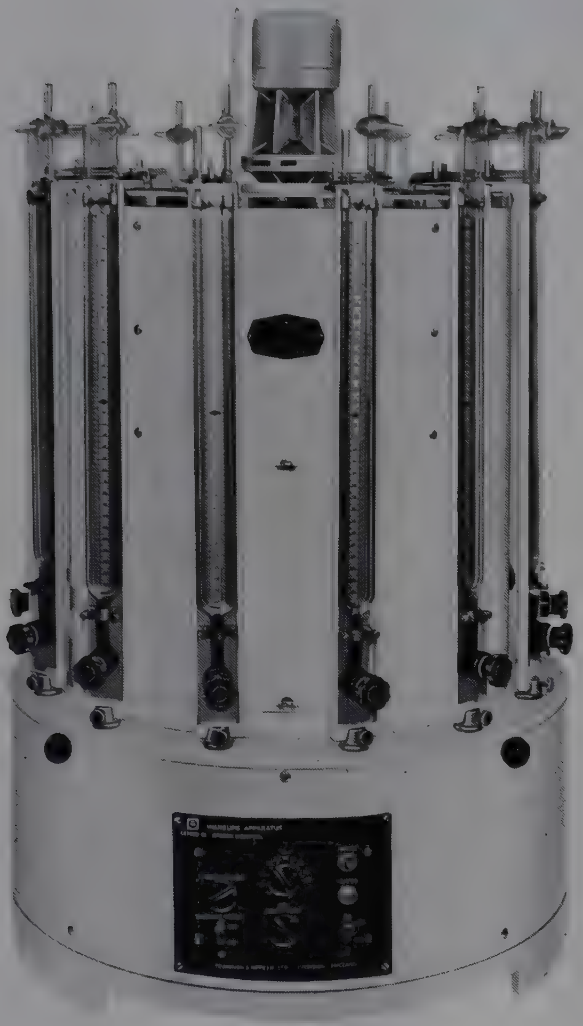


ME-740

All items on this page normally available from stock.

WARBURG APPARATUS

For the measurement of tissue respiration rates and enzyme activities.



ME-800
ME-805

- **Rotating body accepts 13 manometers**
- **Temperature controlled to within ±0·01degC**
- **Adjustable speed and stroke of manometers**
- **Automatic boost heating**

The apparatus comprises a circular tank around the edge of which are mounted thirteen manometers in stainless steel holders. The manometers are oscillated by means of a drive mechanism, the speed and stroke of which are adjustable. Any single manometer can be stopped for examination or adjustment, without affecting the others, merely by holding it. The main body of the apparatus rotates on ball bearings, power supplies being connected through slip rings to give completely unrestricted rotation.

The control and circulation system, together with the heaters, form a central lift-out unit, leaving the outside of the tank unobstructed.

Temperature sensing is by a thermistor bridge which provides minimum fluctuation, rapid heating without overshoot and rapid temperature recovery. The temperature is set by adjusting a knob on a direct reading scale, with final correction on a Fine Adjustment knob.

Energy to the heaters is switched by a plug-in solid state device which is silent in operation and has no moving parts to wear out.

Photosynthesis model

For photochemical work, a glass bottom is fitted to the tank and underside lighting by thirteen tungsten filament lamps is provided. A cooling coil is fitted to the tank and, for work in high ambient temperatures, refrigeration may optionally be fitted.

TECHNICAL DATA

Tank capacity	14 litres
Speed control	0–130 strokes/min
Stroke	13–51 mm
Maximum temperature	60°C
Temperature fluctuation	±0·01degC at 37°C
Power rating (max)	1250W

DIMENSIONS AND WEIGHT

Manometer holders	4·5×1·0×53·5 cm high
Complete apparatus, overall	56 cm dia×91·5 cm high
Net weight	41 kg

ME-800

WARBURG APPARATUS, *T. & M.*, as specification, with auto-boost and thermistor bridge control. Includes 13 standard manometer holders but **without glassware.**

For 220/240V 50/60 Hz supplies	Each	**£498·00**	*m*
For 110/120V 50/60 Hz supplies	Each	**£498·00**	*m*

ME-805

WARBURG APPARATUS, *T. & M.*, **photosynthesis model,** as ME-800 but with 13 tungsten filament lamps and cooling coil. **Without glassware.**

For 220/240V 50/60 Hz supplies	Each	**£657·00**	*m*
For 110/120V 50/60 Hz supplies	Each	**£657·00**	*m*

When ordering please state voltage and frequency of supply.

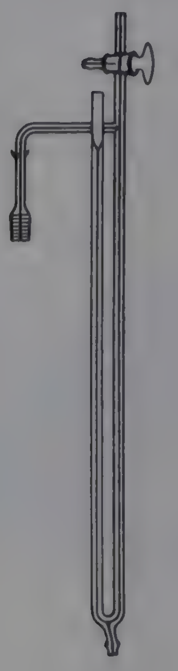
ACCESSORIES FOR ME-800 AND ME-805

ME-812	**Bench stand, for supporting 7 standard manometers when removed from the bath ... ...**	**Each**	**£7·50**	*m*
ME-814	**Cooling coil, with stand and mounting rod.**	**Each**	**£11·30**	*m*

ME-812

AG WARBURG GLASSWARE

- **Fully interchangeable**
- **Borosilicate glass throughout**
- **Manometers and flasks fitted with hooks for joint retaining springs**


ME-830

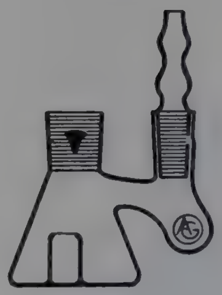
ME-830
MANOMETER, Warburg, Ⓐ, with capillary bore. Fitted with 3-way stopcock and 14/15 cone for connecting flask... ... ... Set of 13 **£55·00** Each **£4·80** *a*

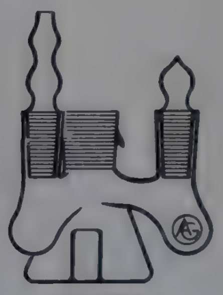
NOTE: The joint for flask connection is fitted with hooks for spring connectors. One pair of spring connectors JR-140, 38 mm is required for each manometer to support either of the flasks listed below.

ME-842
FLASK, Warburg, Ⓐ, with side bulb and gas tube. Main neck 14/15 socket.
Set of 13 **£21·00** Each **£1·80** *a*

ME-844
FLASK, Warburg, Ⓐ, as ME-842 but with additional side bulb which is stoppered.
Set of 13 **£29·00** Each **£2·50** *a*

ME-430	**Pipettes, Warburg,** capacity 0·2, 0·5 and 1 cm³	For prices see entries in List No. sequence.
JR-140	**Springs,** 38 mm	


ME-842


ME-844

Gallenkamp
REGD. TRADE MARK

WATER BATHS

- **Stainless steel interiors**
- **Thermostatically controlled**
- **Capacities from 10 to 70 litres**
- **Sample racks for serological testing**

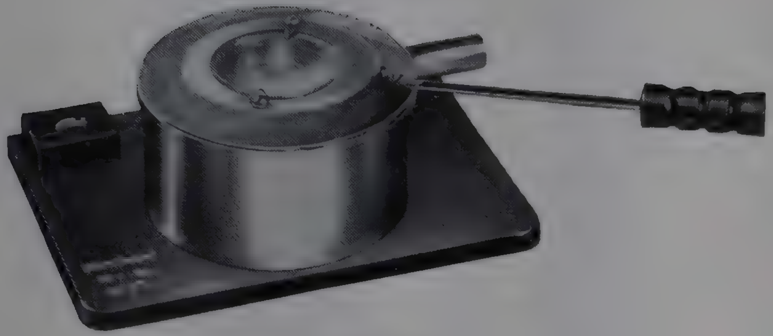
For details and prices see WF-360 to WF-470 in List No. sequence.

Gallenkamp
WF-470 with gabled cover

All items on this page normally available from stock.

Gallenkamp MICRO-MELTING POINT APPARATUS

Enables standard microscopes to be used to determine melting points up to 325°C on single crystals



MF-350

- **For bench and dissecting stage mounting and for clipping on elevated microscope stages**
- **Sample can be illuminated from above or by light from a substage mirror or illuminator**
- **Mains or battery operation**
- **Suitable for melting point of nylon to BS 2782 Part I Method 103 C**

OPERATION

The sample is placed on a cover glass within the central recess of the aluminium alloy melting point block. It is covered with a second cover glass and further shielded by a top plate having a central window of Chance HA1 heat absorbing glass which prevents infrared radiation reaching the eye of the operator. For samples liable to sublimation a suitable hole is provided for using a melting point capillary tube.

Sample temperature may be increased at a rate controlled by means of the variable autotransformer accessory or if a battery supply is used, by means of a suitable rheostat. Temperature is measured using a thermometer which is fitted through a tubulure mounted horizontally on the block.

DIMENSIONS

	H		W		D
Overall	4 5	×	10	×	8 cm
Power rating, max.	60W				

MF-350 with MF-352, microscope ML-072 and thermometer

MF-350

MICRO-MELTING POINT APPARATUS, *Gallenkamp*, as specification. Requires but does not include cover glasses or thermometer. For 10V a.c. or d.c. supplies ... ... Each **£20·50** *b*

Microscopes for use with the above must have a minimum objective lens to stage separation of 45 mm. For suitable microscope see ML-072 in List No. sequence.

ACCESSORIES

MF-352 **Variable autotransformer,** output 10V at 60W. For a.c. single phace supplies.
For 200/250V ... ... Each **£16·50** *m*
For 100/120V ... ... Each **£16·50** *m*

When ordering please state voltage and frequency of supply.

MF-386	**Capillary tubes,** for melting point determinations 100 mm × 1·5–2·0 mm	For prices see entries in List No. sequence.
HJ-762	**Cover glasses,** thickness approximately 0·13 mm, dia. 13 mm and 19 mm	
TJ-340	**Thermometers** with immersion depth 30 mm and various scale spans ...	

All items on this page normally available from stock.

Gallenkamp MELTING POINT APPARATUS

Registered Design No. 889339.

Electrically heated, for determinations of single or mixed melting points up to 350°C.

FEATURES

- **Adjustable rate of temperature rise**
- **Built-in boost heater**
- **Three melting point tubes simultaneously observed by means of full field lens**

ILLUMINATION AND VIEWING

The internal lamp, provides uniform and shadowless illumination of the sample tubes, which are viewed through a 2·5 cm dia. lens. The brightness of the background can be adjusted by rotating a knob to the rear of the apparatus.

HEATING

One heater is regulated by a built-in rotary rheostat which permits accurate adjustment of the rate of increase of temperature as the melting point is approached. The other heater, for boosting the heating rate is controlled by a switch. A second switch controls the lamp and the power input to the apparatus.

DESIGN

A cast aluminium case encloses the heating block and controls. The case, 22×13×30 cm high including thermometer support and melting point tube container, is finished in grey duotone stoved enamel. **For rapid cooling of the apparatus between tests, the water cooled plug is inserted in place of the thermometer.**

MF-370

MELTING POINT APPARATUS, *Gallenkamp*, electrically heated, as specification. **Without thermometer,** cooling plug or capillary tubes.

For 220/240V a.c. or d.c. supplies.	Each	**£23·50**	*b*
For 200/210V a.c. or d.c. supplies.	Each	**£24·00**	*bN*
For 110/120V a.c. or d.c. supplies.	Each	**£24·00**	*bN*

When ordering please state voltage and frequency of supply.

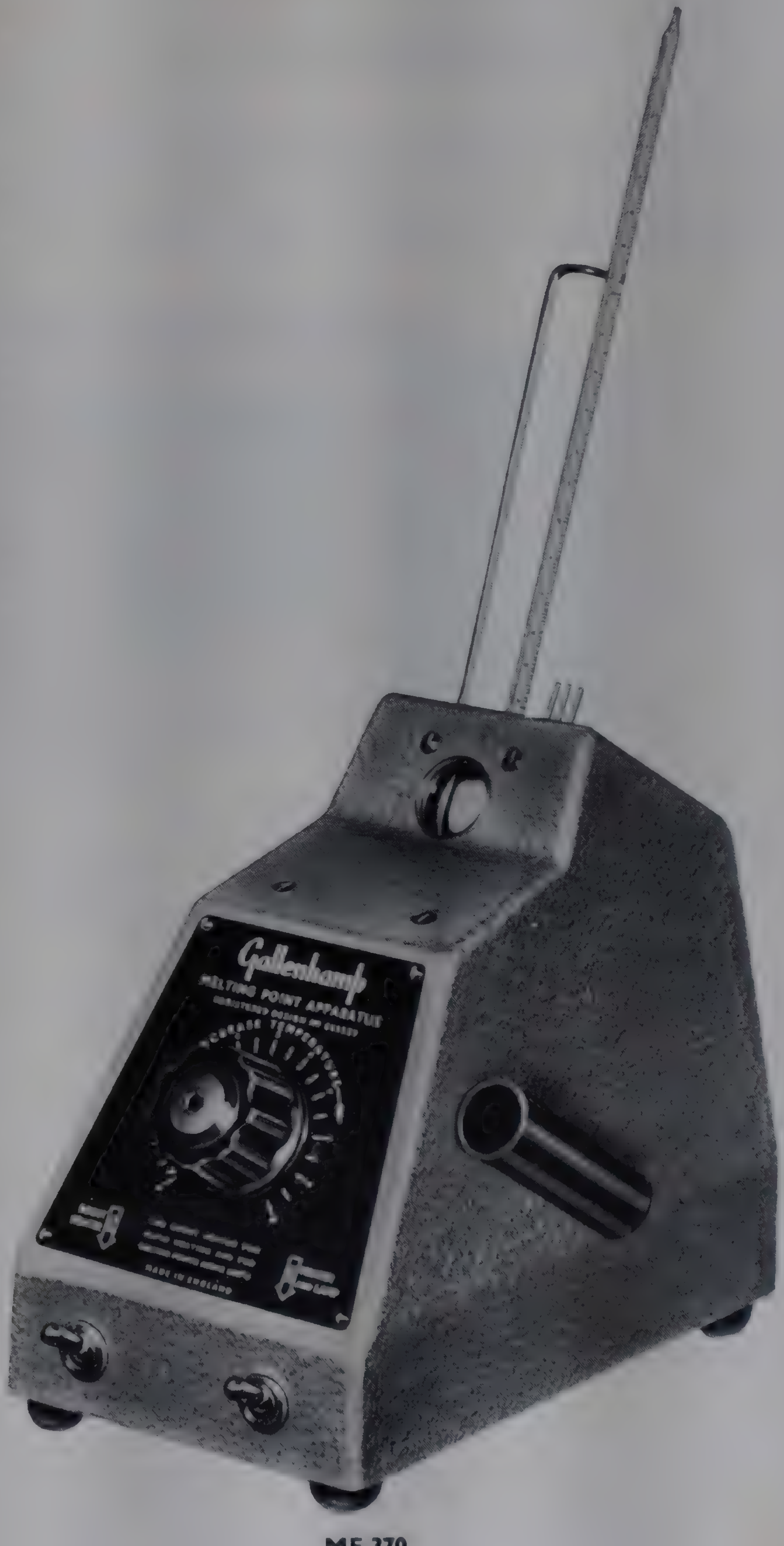
REPLACEMENT PARTS

MF-378	**Lamp,** 15W, SBC, pygmy, white.	Each	**£0·15**	*m*
MF-380	**Heaters** (two required).	Each	**£0·42**	*m*

When ordering replacement parts please state serial number of apparatus and supply voltage.

ACCESSORIES

MF-382	**Cooling plug,** for inserting in thermometer pocket	Each	**£2·00**	*b*
MF-386	**Capillary tubes,** for melting point determinations, 100 mm×1·5–2·0 mm. Clean, dry and sealed at both ends. In pack of 100 tubes. 10 packs **£5·50**	Pack	**£0·60**	*a*
MF-388	**Capillary tubes,** for melting point determinations, 100 mm×1·5–2·0 mm, open both ends. In pack of 100 tubes. 10 packs **£2·60**	Pack	**£0·32**	*a*
TJ-340	**Thermometers,** with immersion depth 30 mm and various scale spans. For details and prices see entry in List No. sequence.			



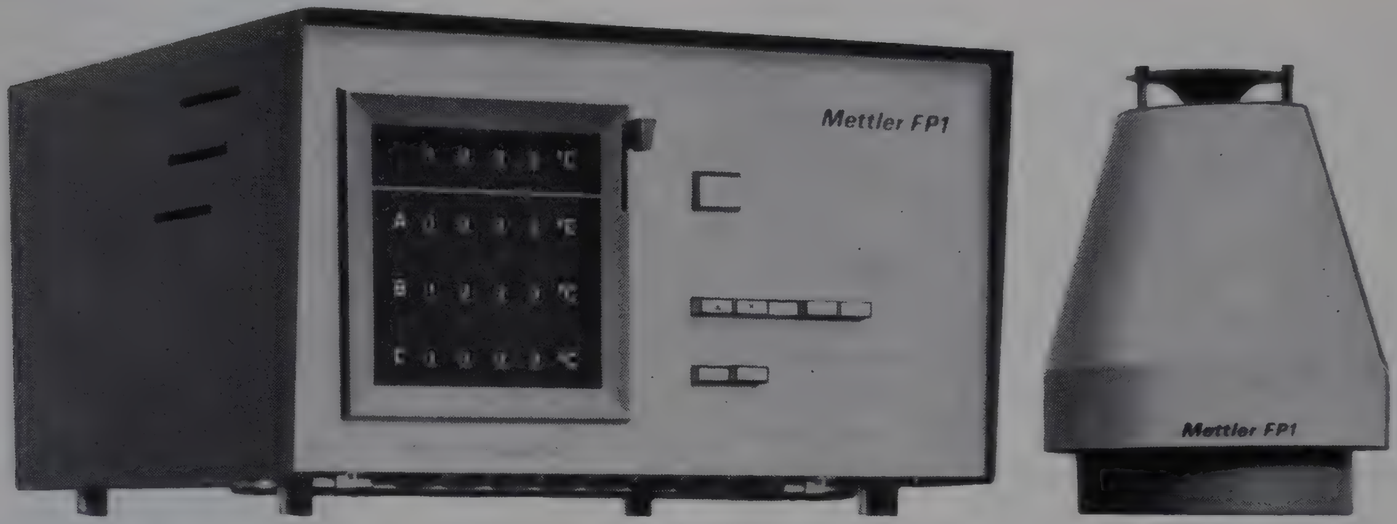
MF-370

Items on this page normally available from stock except those coded *N*.

METTLER AUTOMATIC MELTING AND BOILING POINT APPARATUS MODEL FP1

For the rapid, accurate and reliable determination of melting and boiling points and for recording (by means of a suitable recorder) melting ranges between —20 and 300°C.

- **Accurate temperature measurement by platinum resistance thermometer**
- **Results displayed digitally to 0·1degC**
- **Simultaneous determination of melting point on three samples, with individual readout**
- **Boiling points measured on single samples of 50 to 80μl**
- **Heating programme and starting temperature preselected by push button**
- **Up to 50 determinations an hour**
- **Rapid, automatic fan cooling at end of test**
- **Fully transistorised circuits**



MF-430

Performance and operation

Heating rates, degC/minute	0·2; 1, 2 or 3; 10
	Precision
Melting point at 0·2degC/minute	0·1degC
,, ,, ,, 1, 2 or 3degC/minute	0·5degC
,, ,, ,, 10degC/minute	0·5degC
Boiling point at 0·2degC/minute	0·3degC
Recorder output	100 mV into 5 KΩ minimum

For operation below ambient temperature, down to —20°C the furnace unit must be operated in a refrigerated cabinet.

Dimensions

Base	Height
Control unit 360 × 385 mm	215 mm
Furnace 162 mm diameter	215 mm

Melting point determination

When the 'Ready' light indicates that the preselected starting temperature has been reached, the operator simply inserts the three melting point tubes or single boiling point tube into the furnace, selects the heating rate and presses the start lever. The instrument carries the determinations to completion with no further attention.

The operator is required to do nothing more than read and record the individual results, each clearly displayed on the readout panel.

***MF-430**

MELTING AND BOILING POINT APPARATUS, automatic, *Mettler* **FP1**, as specification, with control unit, furnace unit, melting and boiling point tubes, tube carrier, tube diameter gauge (for other than *Mettler* tubes), standard benzoic acid, spare fuses and bulbs and plastics dust covers. With tapped mains transformer for 110, 125, 145, 160 and 220/240V a.c. supplies ... Each **£454·00** *m*

REPLACEMENT PARTS

MF-440	**Melting point tubes.**	In pack of 150.	Pack	**£1·10**	*a*
MF-446	**Boiling point tubes.**	In pack of 40 ...	Pack	**£0·75**	*a*
MF-448	**Boiling capillaries.**	In pack of 10 ...	Pack	**£1·25**	*a*

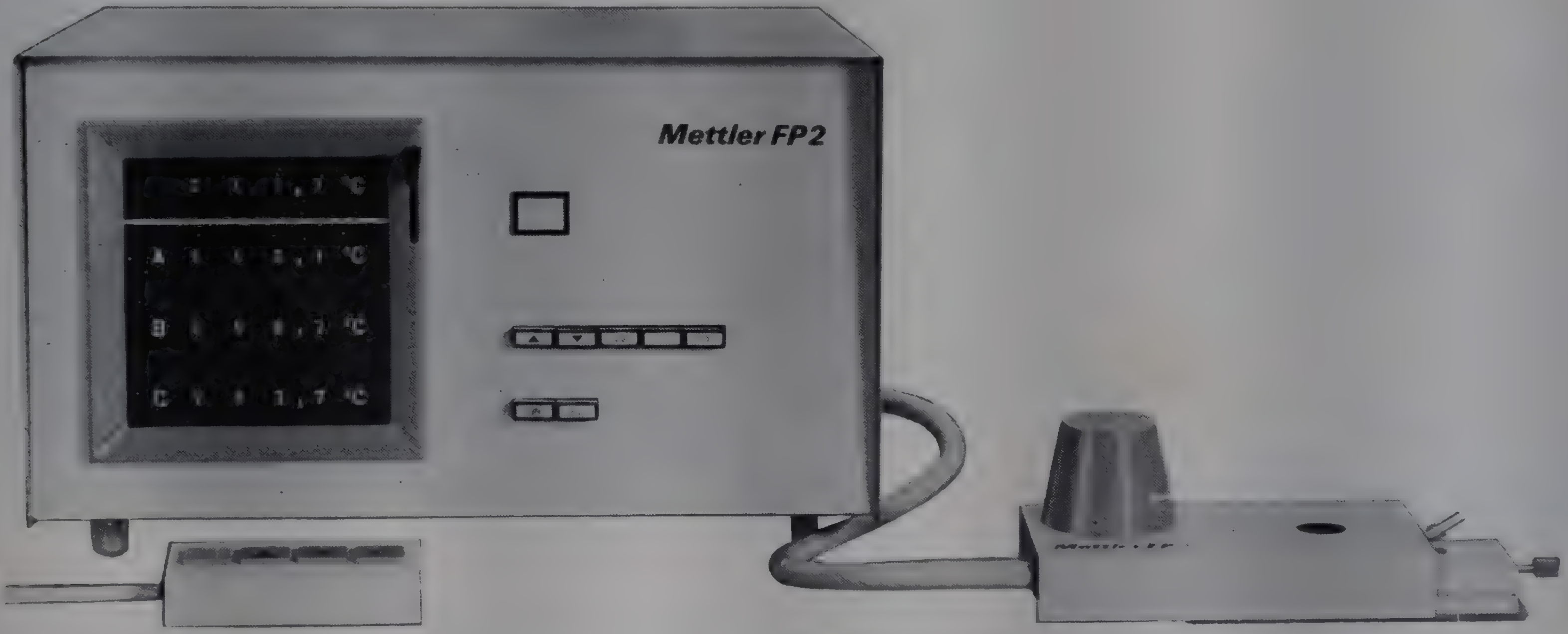
Models modified for three separate recorder outlets are available. Details on request.

All items on this page normally available from stock.

METTLER MICRO-MELTING POINT APPARATUS MODEL FP2

Permits thermomicroscopic investigations to be carried out without the operator's attention being distracted by the need to control the rate of rise of temperature, to read a thermometer or to write down results whilst opening the sample.

- **Determination of micro-melting points**
- **Determination of eutectic temperatures**
- **Investigation of polymorphous substances**
- **Thermal analyses by contact method**
- **Provides uniform temperature field pattern of the micro hot stage**
- **Fully automatic temperature control**
- **Precise temperature measurement**
- **Digital indication of three successive temperatures**
- **Fully transistorised circuitry**



MF-460

CONSTRUCTION

The apparatus comprises three modules:

Hot stage. This is constructed in two parts so that samples are heated simultaneously from above and below. It may be fitted to any standard microscope with either fixed or sliding stage. The heating plates incorporate a platinum resistance thermometer used for temperature measurement and a heat filter to protect the microscope objective. Built in to the hot stage is a compact air blower which prevents the outer walls of the stage from becoming too hot and provides rapid cooling at the end of a test. A small nozzle is attached to the hot stage so that cold gases may be blown across the heating plates allowing determinations below ambient to be carried out at normal room temperature.

Controller. Contains digital temperature indicators and push button controls for temperature programme. Rapid initial heating and final cooling controls are alongside push button selectors for 0·2degC/min, 1, 2 or 3degC/min and 10degC/min heating programmes. A modified version is available to provide programmed cooling and heating. The linearity of the programme selected is strictly monitored and governed by electronic systems within the controller. Readout is stored and indicated digitally to an accuracy of 0·1degC. The counters are automatically zeroed at the commencement of the next test so that they cannot be arbitarily or accidentally cancelled.

Push button station. Each time the operator observes a change and wishes to record the temperature at which it occurred, he has merely to press one of the three buttons, labelled A, B and C, on this station and the accurate temperature comes up on the controller, ready to be noted at the end of the test. In this way the operator needs neither to read a temperature indicator nor to write down the result while his concentration is focused on observing the sample. A fourth button is provided which arrests the temperature programme and allows isothermal observations to be made at any time.

METTLER MICRO-MELTING POINT APPARATUS MODEL FP2

(Continued)

PERFORMANCE DATA

Temperature range	−20 to +300°C
Heating rates	0·2; 1, 2 or 3; 10degC/min linear
Accuracy of hot stage temperature (on 0·2degC/min rate and isothermal)	±0·1degC between 30 and 100°C ±0·2degC between 100 and 200°C ±0·3degC between 200 and 300°C
Readability	0·1degC digital step

DESIGN DATA AND DIMENSIONS

Sample recess (prismatic)	45×30×2 mm
Sample carrier (trimmed)	76×19×1 mm
Cover glass	15×15×0·2 mm
Field of vision	2·5 mm diameter
Sample/objective clearance	7·0 mm
Stage/objective clearance	29 mm

Admissible ambient	−20° to +40°C
Controller	36×38·5×21·5 cm high
Hot stage	19·5×8·5×2·8 cm high (height of blower 4·8 cm)
Length of connecting cable	100 cm
Power supply	110, 125, 145, 160, 220 and 240V a.c.
Admissible voltage fluctuation	±10%
Power consumption	90W
Weight, net	15 kg (33 lb)

***MF-460**

MICRO-MELTING POINT APPARATUS, *Mettler* Model FP2, as specification, comprising hot stage, controller and push button station. Includes two sets of 50 sample carriers and cover glasses, cooling vane, protective heat filter, replacement fan motor, 3 each fuses 1A and 6·5A, 2 indicator lamps and dust cover. Each **£454·00** *m*

A modified version which provides push button control of programmed cooling and heating is available. Details on request.

REPLACEMENT PARTS

***MF-466** **Object stages,** 75×18×1 mm thick. In pack of 100. Pack **£1·20** *m*

***MF-468** **Cover slips,** 15×15×0·2 mm thick. In pack of 100. Pack **£0·60** *m*

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Most British Standards prepared or revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓖ or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

METTLER AUTOMATIC DROP POINT APPARATUS MODEL FP3

For the rapid determination of the drop point of greases, fats and waxes

- **Drop points determined in accordance with methods described in ASTM D566 - IP132 and DIN 51801 using grease cup of standard dimensions**
- **Photoelectric detection ensures reproducible results**
- **Digital indication of drop point temperature**
- **Heating programme and starting temperature preselected by push button**
- **Fully automatic control of temperature**
- **Fully transistorised circuitry**

Mettler FP 3
Mettler FP 31

MF-480

The apparatus is similar in design and appearance to MF-430 but the furnace unit is modified to accept a grease cup of internal dimensions specified in ASTM D566 - IP132 and DIN 51801.

PERFORMANCE DATA

Temperature range	−20 to +300°C (investigations below ambient temperature require a refrigerating chamber)
Heating rates	0·2; 1, 2 or 3; 10degC/min linear
Accuracy of hot stage temperature (on 0·2degC/min rate and isothermal)	±0·1degC between 30 and 100°C ±0·2degC between 100 and 200°C ±0·3degC between 200 and 300°C
Readability	0·1degC digital step

DESIGN DATA AND DIMENSIONS

Sample quantity	0·4 to 0·6 g
Admissible ambient	−25° to +40°C
Controller	36 × 38·5 × 21·5 cm high
Hot stage	16 cm dia. × 21·5 cm high
Length of connecting cable	70 cm
Power supply	110, 125, 145, 160, 220 and 240V a.c.
Admissible voltage fluctuation	±10%
Power consumption	90W
Weight, net	28 kg

***MF-480**

DROP POINT APPARATUS, automatic, *Mettler* FP3, as specification, comprising furnace, controller with digital temperature indication and push button heating rate controls. Includes 2 grease cup holders, spatula, rod, 5 spare grease cups, 3 each fuses 1A and 1·6A, 2 indicator lamps and dust cover ... ... Each **£454·00** *m*

REPLACEMENT PARTS

***MF-487**	**Spares kit,** comprising 2 grease cup holders, 2 grease cups, spatula and rod	Kit	£15 50	*m*
***MF-488**	**Grease cup,** set of 5	Set	£1 85	*m*

All items on this page normally available from stock.

MF-550

MF-550

MELTING POINT APPARATUS, *Electrothermal,* for the determination of melting points between 20 and 360°C. With block for up to 3 melting point tubes, which are illuminated by two lamps and viewed through a fixed focus lens. With rheostat to control rate of heating and boost heater button. Includes bottle of 'Aquadag' for coating the thermometer bulb, one pack of 100 capillary tubes and thermometer. Overall height without thermometer 41 cm, weight 6 kg. For 200/250V a.c. supplies ... ... Each **£71·80** *m*

MF-555

MELTING POINT APPARATUS, *Electrothermal,* as MF-550 but **without rheostat or boost heater button** ... ... Each **£60·20** *mN*

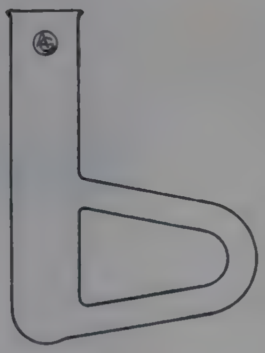
When ordering please state voltage and frequency of supply.

REPLACEMENT PART for MF-550 and MF-555

MF-562 **Thermometer,** scale span 20–360°C adjusted for 34 mm immersion ... ... Each **£4·90** *f*

ACCESSORIES for MF-550 and MF-555

MF-386	**Capillary tubes**	For details and prices see entries in List No. sequence.
MF-388	**Capillary tubes**	



MF-570

MF-570

MELTING POINT TUBE, Thiele, Ⓐ borosilicate glass. An inexpensive and accurate apparatus for heating melting point tubes at accurate rates for the determination of melting points. A capillary tube is wired to a suitable melting point thermometer so that the sample it contains is held close to the thermometer bulb. By means of a drilled cork the thermometer and capillary are mounted in the Thiele tube which is filled to just above the side limb with a non volatile fluid. On heating the bend of the side limb, heated liquid circulates and raises the temperature of the sample in such a way that stirring is unnecessary ... ... Ten **£5·50** Each **£0·62** *a*

ACCESSORIES

MF-388	**Capillary tubes,** for melting point determinations, 100 mm × 1·5–2·0 mm, open both ends	For prices see entries in List No. sequence.
TJ-340	**Thermometers** with immersion depth 30 mm and various scale spans.	

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories. Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

Items on this page normally available from stock except those coded *N*.

Gallenkamp MERCURY STILL

Construction

The distillation vessel is a borosilicate glass bulb with wide-bore capillary feed and outlet tubes. A water cooled cold-finger condenser is sealed into the top of the bulb, which rests on an electric heater in an asbestolite insulating box. The whole assembly, including a mercury feed system and siphon outlet, is mounted on a wood stand with a large mercury tray base. A rheostat is used to adjust the heat input.

Automatic feed

Comprises a stainless steel reservoir suspended from a spring which maintains a constant mercury level in the distillation bulb. The still will process about 10 kg, without replenishment. The reservoir can be filled without interrupting the distillation process. A safety switch turns off the heater when the mercury level falls too low.

Operation

When heat is applied, the mercury in the bulb boils *in vacuo*, condenses and flows down the outlet tube. Raw mercury from the reservoir flows into the feed tube. The distillate falling into the outlet tube produces a Sprengel pumping action which maintains a sufficient vacuum for the process provided the mercury is reasonably clean. Distilled mercury siphons out of the trap into a stock bottle. Output is approximately 2·5 kg/hr.

Dimensions 31 × 36 × 145 cm high.

MF-855

MERCURY STILL, AUTOMATIC, *Gallenkamp*, as specification, electrically heated, with rheostat, automatic feed and instructions manual. For a.c. single phase supplies only.

For 200/250V	Each	**£88·00**	*b*
For 110/120V	Each	**£90·00**	*bN*

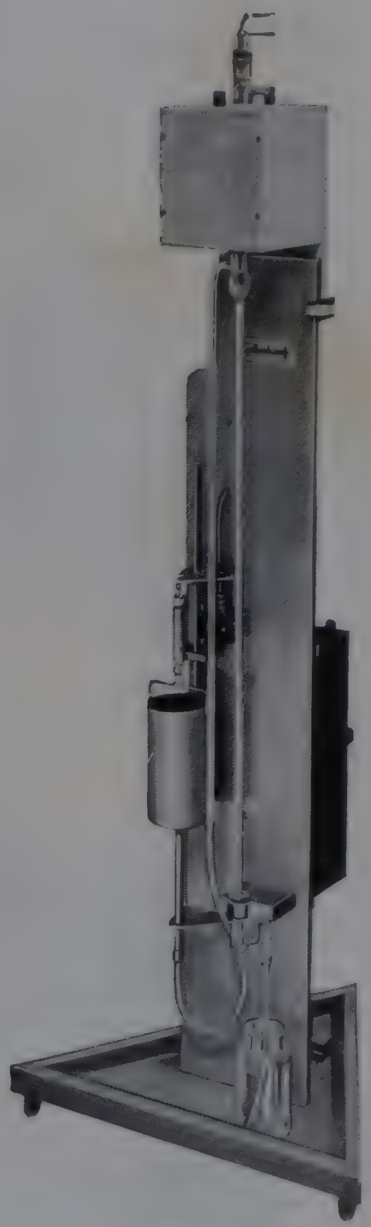
When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

MF-860	**Heating element**	Each	**£4·70**	*b*

When ordering please state voltage and frequency of supply.

MF-862	**Main glass part only,** borosilicate glass.	Each	**£6·10**	*a*



MF-855

Gallenkamp
REGD. TRADE MARK

MERCURY PURIFICATION APPARATUS

MF-880

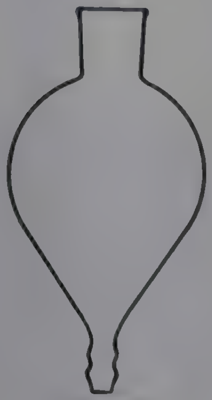
MERCURY PURIFICATION APPARATUS, *Gallenkamp*, **Ostwald.** Mercury is cleaned by allowing it to fall in the form of small globules down a column of dilute nitric acid. The very small mercury drops are formed by passage through a sintered glass plate situated in the mercury reservoir at the top of the glass column. The apparatus is mounted on a hardwood stand with large mercury tray base... ... ... Each **£11·50** *b*

MF-885	**Main glass tube only,** for MF-880 ...	Each	**£2·00**	*a*
MF-890	**Reservoir, glass, with sintered plate,** porosity 0, 30 mm dia.	Each	**£1·35**	*a*

MF-880

SINTERED FILTER TUBES for purification of mercury see FD-582 in List No. sequence.

Items on this page normally available from stock except those coded *N*.



MF-920

MF-920

MERCURY RESERVOIRS, glass.

Capacity	150	250 ml	
Ten	**£2·65**	**2·90**	*m*
Each	**£0·33**	**0·35**	

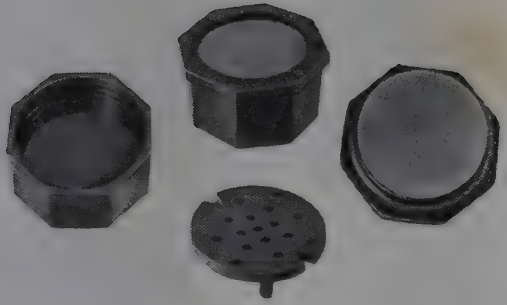
***MF-930**

MERCURY, virgin, in polythene bottle containing 3 kg.
Each **£42·00** *m*

***MF-932**

MERCURY, triple distilled within A.R. Specification. In stoneware bottles.

Weight	500 g	1	3 kg	
Each	**£10·00**	**18·50**	**54·00**	*c*



MF-935

MF-935

MERCURY COLLECTOR, for picking up spilt mercury, thus reducing this dangerous laboratory hazard. Comprises a plastics foam pad in a screw top polythene container. In use, the top with the pad attached is pressed firmly against the surface where mercury has been spilt. Mercury globules enter the cells in the pad and are expelled into the container when the lid is replaced. The lid contains a spare foam pad.
Each **£1·10** *m*

MF-937 **Plastics foam pad,** spare for MF-935.
Pack of 6 **£0·20** *m*

Mercury tray see **TRAYS.**

MERCURY VAPOUR METER

Designed to meet the requirements of health authorities, this compact instrument provides for the frequent intermittent monitoring of atmospheric mercury vapour.

Stability and freedom from errors result from employing a two channel system. Air which may be contaminated with mercury vapour is compared in two absorption chambers with air filtered free from mercury. The chambers are irradiated with UV at 254 nm from a cold cathode discharge lamp and any out-of-balance is detected photoelectrically and displayed on a microammeter directly calibrated in concentration of mercury.

Air may be aspirated through this instrument with any small vacuum or water-jet pump having a capacity of 600 l/hr but the matching, purpose-built auxiliary aspirator pump is recommended.

Sensitivity	0–100 and 0–600 μg mercury/m³ air.
Power supply:	200/250V 50 Hz single phase.

MF-950 MF-952

MF-950

MERCURY VAPOUR METER, *Hanovia,* as specification, **without aspirator pump** ... Each **£390·00** *fN*

ACCESSORY

MF-952 **Aspirator pump** with built-in flowmeter and needle control valve ... ... Each **£63·00** *fN*

Items on this page normally available from stock except those coded *N***.**

Gallenkamp SPECIALITIES FOR METALLURGICAL ANALYSIS

COLORIMETER

Gallenkamp COLORIMETER

- Transistorised stabiliser circuit.
- Rapid response—stable readings.
- Wide range of filters available.

For full details see CS-200 in List No. sequence.

CS-200

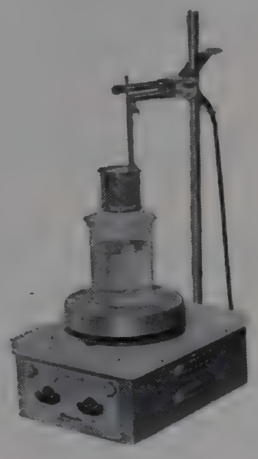
FLAME ANALYSER

- 5 ppm K and 2 ppm Na full scale
- Insignificant cross-interference.
- Immediate operation, negligible drift.

For full details see FH-500 in List No. sequence.

FH-500

ELECTRODEPOSITION ANALYSER



- Hotplate and magnetic stirring.
- Stationary electrodes.
- Single or 3-test unit.

For full details see EJ-090 et seq. in List No. sequence.

EJ-090

TUBE FURNACE

- Maximum temperature 1400°C.
- Heating to 1400°C in under 2 hours.
- Built-in element economiser transformer.

For full details see FS-300 in List No. sequence.

FS-300

METALLURGY
SECTION INDEX

Item	Page	Item	Page
Corrosion cabinets	469	Polishing materials	466
Engraving tool	467	Salt spray cabinet	469
Gasometric apparatus	468	Specimen cabinet	467
Mounting kit	464	Specimen grinders	465
Mounting media	464	Specimen polishers	466
Mounting press	464	Thickness gauge	468

Other equipment used in Metallurgical Analysis will be found under the following section headings:

Boats
Crucibles
Colorimeters
Electrochemical analysis
Furnaces
Gas analysers
Mills
Ovens
Particle size
Sample dividers
Sieves
Spectrophotometers

MOUNTING PRESS

For mounting metallurgical specimens in plastics for examination. Using this press, routine mounting can be achieved simply and rapidly—about four minutes per mount. Absolute adhesion of the mounting medium to the metal enables the extreme edges of such parts to be studied. This press can be used for the examination of ball-bearings, wires, plated sheets, etc., and the use of mounting medium avoids the differential etching that occurs very frequently when fusible alloys are used for the mounting. The press is equipped with a positive ejector for easy removal of the mount from the mould.

MH-510

Gallenkamp HOTPLATES

- **Alternative energy regulator or thermostat control**
- **Surface temperatures up to 550°C**

For details and prices see HL-010 et seq. in List No. sequence.

MH-510

MOUNTING PRESS, for 5 ton load, a self-contained bench type hydraulic press with rising bottom platen, fitted with hydraulic gauge reading 0 to 11,000 lb total thrust. With insulating plates, hand pump and oil storage facilities for the ram and provided with a thermometer pocket ... ... Each **£135·00** *f*

MH-515

MOUNTING PRESS, for 10 ton load, as MH-510 but with four column guides ... ... Each **£228·50** *fN*

ACCESSORIES suitable for pressures up to 2tf/in.²

MH-520 **Mould outfit,** comprising a steel cylinder, base and plunger drilled for thermometer.

For moulds	1	1¼ in dia.	
Each	£17·35	17·85	*f*

MH-530 **Mould heaters, split type,** with cast aluminium head, cartridge elements, plated tongs and ebonite handles.

For moulds	1	1¼ in	
Each	£45·00	52·50	*f*

MH-532 **Mould coolers, split type,** with cast aluminium head, plated tongs and ebonite handles.

For moulds	1	1¼ in	
Each	£28·90	34·00	*fN*

Heat controllers, for accurate temperature control of above mould heaters, see EC-810 et seq. in List No. sequence.

TJ-050 **Thermometer,** mercury-in-glass, scale span 0–200°C. See entry in List No. sequence.

MOUNTING MEDIA

MH-537

MOUNTING MEDIUM, thermosetting black bakelite, in pack containing 1 kg which is sufficient for about 70 mounts ... ... 5 packs **£3·70** Pack **£0·80** c

MH-539

MOUNTING MEDIUM, thermoplastic acrylic transparent crystals. In pack containing 1 kg which is sufficient for about 70 mounts. 5 packs **£7·80** Pack **£1·70** c

MH-550

PLASTICS MOUNTING KIT, a cold setting acrylic resin for cold or hot mounting of metallographic specimens with or without pressure. The complete kit, comprising 1 lb powder, ½ lb liquid and 2 oz of acid hardener which is only used for increasing hardness if mount does not require stamping, is sufficient for mounting about 100 specimens ... ... Each **£1·90** *m*

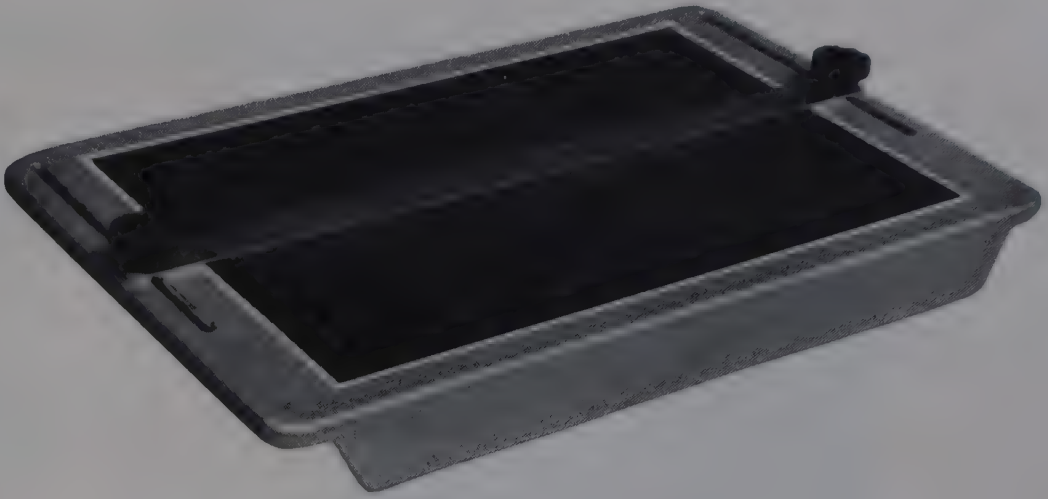
Full details of method on application.

Items on this page normally available from stock except those coded *N*.

SPECIMEN GRINDERS

MH-600

HAND GRINDER, for rough finishing of metallographic specimens on grinding papers or cloths of dimensions $9\times13\frac{3}{4}$ in. Comprises frame with an elevated polished black glass platform on which the grinding paper is securely held by a clamping bar.
Each **£19·80** *f*



MH-600

MH-625

GRINDING MACHINE, bench mounting. The two 13 cm dia. grinding wheels, one coarse and one fine, are fitted to either end of the grinder and are protected by full sized heavy duty guards. The wheels are driven by a 210W geared motor fitted with ball bearings which are lubricated for life. An adjustable rigid tool rest is fitted in front of each wheel and a water tray for quenching is at the front of the grinder. For 230/250V a.c. single phase supplies ... ... Each **£14·70** *f*

MH-625

MH-630

BELT SURFACER, for dry surfacing of specimens. Comprises endless belt on two pulleys, one driven by an electric motor fitted in the base. With case fitted with handles and $5\frac{3}{4}\times4$ in surfacing aperture. For 230/250V 50 Hz single phase supplies ... ... Each **£159·50** *f*

A low cost microscope for stereoscopic examination of small metallurgical samples.

- Robust construction.
- Rotating turret with parfocal objectives.
- Distortion-free optics—vivid imagery.

Olympus **Low Power Stereoscopic Microscope Model VT-11**

See ML-340 in List No. sequence.

MH-630

POLISHING MACHINES

MH-705

POLISHING MACHINE, manual, with 8 in dia. disk to take polishing cloths or abrasive paper. With fractional hp 1420 rev/min motor, giving disk speeds of 500, 750 and 1000 rev/min, mounted on a heavy metal box together with a splash guard and drip-feed reservoir. The rate of feed and the height and position of the reservoir can be varied as required. For 220/240V a.c. single phase supplies ... ... Each **£98·50** *fN*

MH-705

MH-725

MH-725

POLISHING MACHINE, automatic, with 6 in dia. disk. A compact machine with mechanically operated specimen holders. It may be controlled remotely for radioactive work and is readily adaptable for grinding, polishing or etch polishing. Specimens are held by a swinging parallel linkage driven by the motor. Lubricant is supplied from a tank; precise control is effected by a needle valve. Speed control may be obtained using a variable transformer. With ball-ended and cup-ended specimen holders.
Dimensions 22 × 24 × 38 cm. Weight 8 kg.
For 230/250V a.c. supplies ... ... Each **£243·00** *fN*

ACCESSORY

ED-602 **Variable transformer,** for speed control. For details and price see entry in List No. sequence.

POLISHING MATERIALS

MH-740

ALUMINA POWDER, dry state, for rapid scratch free polishing of metallurgical specimens. In bottle containing 25 g.

Grade Particle size, average	2/20 2	1/30 1	Gamma under 1 µm	
5 bottles	**£5·30**	**8·60**	**10·00**	*m*
Bottle	**£1·14**	**1·85**	**2·15**	

MH-742

CARBORUNDUM POWDER, for coarse polishing of metallurgical specimens. In pack containing 1 lb (450 g).

Mesh size	400	600	
Pack	**£0·70**	**1·00**	c

MH-745

DIAMOND ABRASIVE AEROSOL, *Marcon.* An aerosol dispenser, designed specifically for use with metallurgical specimens. Applies a diamond polishing compound through a special valve to result in an accurately dispersed application of diamond over the whole face of the specimen. The chemical base, which has strong adherent properties, also prevents sedimentation or agglomeration of the diamond particles. The suspension is water soluble with built-in lubricant and cleaning solution. It is coloured (but non-staining) to provide an indication of the thickness of the layer on the work surface and the micron grade being used. In spray can containing approximately 110 ml (4 fl. oz).

Mean particle size (µm)	Colour code	Purpose	Each	
¼	Pink	Fine finishing	£ **4·00**	*m*
1	Blue	Routine investigation	**3·25**	*m*
6	Yellow	Pre-polish	**6·25**	*m*

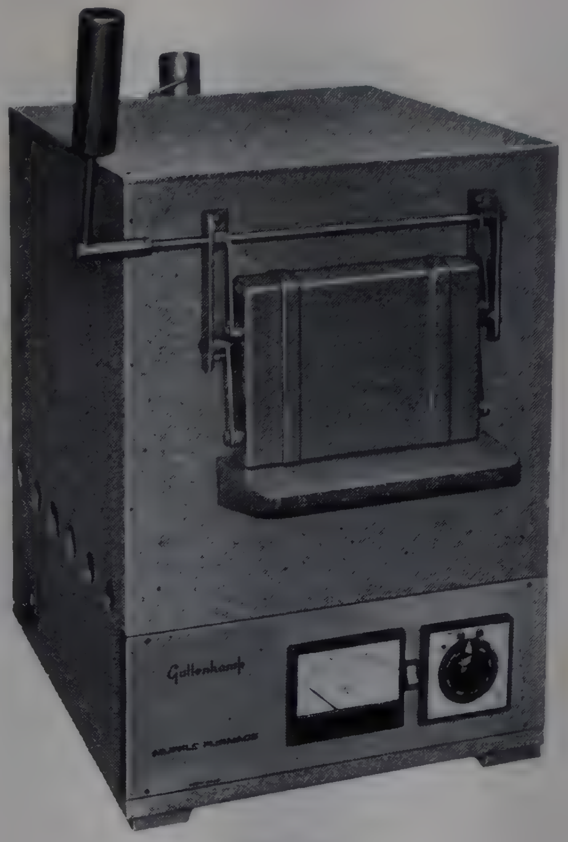
Items on this page normally available from stock except those coded *N*.

Gallenkamp
REGD TRADE MARK

MUFFLE FURNACES
1000°C/1100°C

A range of muffle furnaces in three sizes with three alternative forms of control suitable for laboratory or tool room use.

- **Heating to 1000°C in 1½ hours**
- **±2degC control with proportional controller**
- **Draught control chimneys fitted at rear**
- **Factory assembled temperature fuses prevent damage by accidental overheating**



FR-612

For detailed specifications and prices see FR-600 et seq. in List No. sequence.

For *Gallenkamp* **BOX FURNACES,** maximum temperatures 1250°C to 1500°C, see FR-655 et seq. in List No. sequence.

For *Gallenkamp* **TUBE FURNACES,** maximum temperatures 1200°C to 1500°C, see FS-212 et seq. in List No. sequence.

MH-780

MH-780

SPECIMEN ENGRAVER, a portable, solenoid-operated vibro tool for engraving metallurgical specimens. For 230/250V 50 Hz single phase supplies. Complete with hard point engraving head ... ... Each **£4·75** *m*

REPLACEMENT PARTS AND ACCESSORIES

MH-783	**Hard point**	Each	**£0·20**	*m*
MH-784	**Extra hard point**	Each	**£0·25**	*m*
MH-785	**Diamond point**	Each	**£2·25**	*m*

MH-790

SPECIMEN CABINET, with seven sealed drawers each with canister of indicating desiccant and lined to protect the surfaces of specimens. Each drawer is 5 cm deep and will accommodate one specimen rack MH-791 or MH-792. Overall dimensions 70 × 56 × 51 cm, nett weight 80 kg.
Without racks ... ... Each **£77·00** *fN*

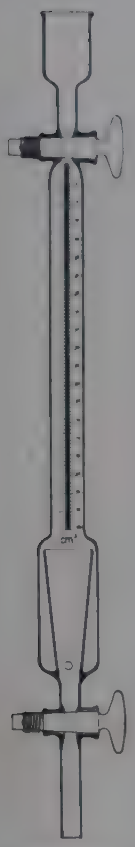
In the U.K. the cabinet is supplied in a crate charged at £5·00 which is refunded on return in good condition.

ACCESSORIES

MH-791	**Rack, to accommodate 86 × 1½ in specimens.**	Each	**£4·50**	*fN*
MH-792	**Rack, to accommodate 96 × 1 in specimens.**	Each	**£4·50**	*fN*

MH-790

Items on this page normally available from stock except those coded *N.*



MH-825

MH-830

MH-825

GASOMETRIC APPARATUS, *Technico,* to BS 443, for determination of the thickness of galvanised coatings on wire. Comprises 100 cm³ burette subdivided in 0·5 cm³ with bulb, two stopcocks and a tubulure for connection to a levelling bulb. **Main glass part only.**

Each **£9·10** *a*

ACCESSORY

MF-920 **Mercury reservoir** levelling bulb, capacity 150 ml. For price see entry in List No. sequence.

MH-830

THICKNESS GAUGE, *Elcometer,* a hand-operated instrument for direct thickness measurements of any non-magnetic coating on a ferrous base. Comprises a strong, permanent magnet with an air gap in which an armature, attached to the pointer, is situated. The proximity of a ferrous surface to the two contact spheres directly affects the flux passing through the air gap and thus the pointer deflection. Readings are accurate to ±5%. With double scale calibrated 0 to 0·20 in and 0 to 0·5 mm ... ... Each **£18·00** *f*

Gallenkamp HUMIDITY OVENS

REGD TRADE MARK

OV-700 with OV-780

NON-INJECTION MODEL

For corrosion investigations under simulated temperate or tropical conditions.

- **Temperature control by** *Compenstat* **(solid state)**
- **Humidity by the use of saturated salt solutions**
- **Air circulation by powerful centrifugal fan**
- **Glass inner door for observing samples**

For detailed specification, accessories and prices see OV-620 et seq in List No. sequence.

STEAM INJECTION MODEL to BS 3898

For climatic, durability and accelerated weathering tests under simulated tropical and extreme tropical conditions.

- **Temperature and humidity control by wet and dry bulb contact thermometers**
- **Air circulation by powerful centrifugal fan**
- **Double glazed viewing window in door**
- **Full range of accessories and programme control systems**
- **Suitable for many standard test methods**

For detailed specification, accessories and prices see OV-700 et seq. in List No. sequence.

All items on this page normally available from stock.

CORROSION RESISTANCE OF SURFACE COATING

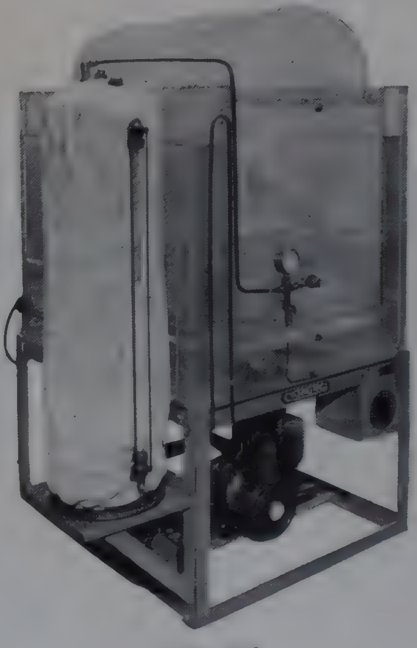
MH 860

MH-860

SALT SPRAY CABINET, to BS 1224, ASTM B117/64 and ASTM B287/62, for testing the resistance to corrosion by salt spray or acetic acid salt spray of electroplated materials. Comprises a plastics cabinet, 75 × 50 × 50 cm, jacketted on three sides, an integral 40 litres brine chamber and a domed plastics cover, all mounted on a rigid metal frame. The water in the jacket is heated by two 900W immersion elements and thermostatically held at 95°F. A humidifier tower is built into one side and a pair of nozzles set at right angles cause the formation of a fine mist. A diaphragm type compressor is driven by a $\frac{1}{3}$ hp motor for 230/250V 50 Hz single phase supplies. With diaphragm type pressure gauge calibrated 0–40 lbf/in^2. Overall dimensions 135 × 105 × 71 cm. Each **£410·00** *f*

When ordering please state voltage and frequency of supply.

Salt spray tank see PB-230 in List No. sequence.



MH 870

MH-870

ACCELERATED CORROSION TEST CABINET, for the copper accelerated salt spray (CASS) test described in BS 1224 and ASTM B368, also for the acetic acid and salt spray tests detailed under List No. MH-860. Comprises transparent plastics spray cabinet with lid, integral brine chamber, external humidifier and air compressor all mounted on metal frame. A water jacket on three sides is heated by two 900W elements thermostatically controlled at 135°F and with mercury thermometer range 80 to 160°F to indicate temperature. The humidifier is operated by a 1000W heater. The air compressor for atomising the spray has a $\frac{1}{4}$ hp motor and pressure gauge. Overall dimensions 103 × 102 × 140 cm high. Internal dimensions 75 × 50 × 50 cm high. For 230/250V 50 Hz single phase supplies ... ... Each **£506·00** *f*

When ordering please state voltage and frequency of supply.

METEOROLOGICAL APPARATUS

Apparatus for meteorological purposes will be found in this catalogue as list below.

BE-350 to BE-430	**Barometers,** mercury.
BE-450	**Barometer,** aneroid.
BE-500 to BE-520	**Barographs.**
HV-010 to HV-080	**Hygrometers,** dew point.
HV-100 to HV-125	**Hygrometers,** Mason.
HV-200 and HV-201	**Hygrometers,** whirling.
HV-240	**Hygrometer,** Assman.
HV-252 to HV-260	**Humidity** tables and calculator.
HV-400 to HV-450	**Hygrometers,** paper and hair.
RB-820	**Rain gauge.**
SH-080 to SH-090	**Soil moisture tensiometers.**
SH-210	**Thermometers,** soil.
TJ-920 to TJ-940	**Thermometers,** maximum and minimum.
TJ-930 to TJ-965	**Thermometers,** wall.
TK-100 to TK-105	**Thermographs.**
TK-150 to TK-155	**Thermohygrographs.**

MICROBIOLOGY

Within this Section we have grouped a range of apparatus which will be of interest to the microbiologist. Full details and prices of all items mentioned can be found under the appropriate entries in List No. sequence throughout the catalogue.

It is difficult to include within such a section all items which may be required and other apparatus, glassware and hardware will be found under the following page headings:

Balances
Bottles
Centrifuges
Crucibles, filtering
Culture
Dissecting
Electrochemical Analysis
Filter Pumps
Filters, sintered glass
Flasks
Freeze Drying
Histology
Medical
Microscopes
Mixers
Pipettes
Tubes
Water and Chemical Pumps

MAJOR ENTRIES IN THIS SECTION

page

STERILISATION

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Filter holders... 471
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INOCULATION

Glove box 472
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CULTIVATION

Anaerobic culture jars 476
Controlled environment culture apparatus 473
Incubators 474
Water and steam baths 476

COUNTING AND EXAMINATION

Colony counter 477
Colorimeter 477
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WASHING AND DRYING

Drying cabinet 479
Glassware dryers 479

STERILISATION

AX-100

Gallenkamp AUTOCLAVES

For electric, gas or steam heating

Designed in accordance with BS 2646 for sterilisation up to 2·1 kgf/cm² (30 lbf/in²).

Approved by the Associated Offices Technical Committee for insurance purposes.

- **Safe, reliable and easy to handle**
- **Automatic air vent and safety valve**
- *Compenstat* **control of steam temperature within ±1degC**
- **Sturdily engineered for long life**
- **Outer case remains cool during operation**

See AX-100.

See also AX-250 et seq. for automatic, portable and other vertical and horizontal autoclaves to suit a variety of applications.

For full details and prices of the above items see entries in List No. sequence.

STERILISATION

Gallenkamp OVENS

Gallenkamp manufacture a wide range of ovens suitable for hot air sterilising. Models include:

HOTBOX OVEN/STERILISERS, 200°C with extra wide shelves—see OV-010.

BS OVENS, 250°C. High performance ovens to BS 2648 and BS 3421—see OV-160.

OVEN/STERILISER, 250°C. A large capacity sterilising oven to BS 3421—see OV-420.

For full details of these and other models see OVENS.

Gallenkamp
Hotbox

OV-010 Size 2

Gallenkamp FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION USING 50 mm FILTER MEMBRANES

Easily assembled holders used widely for:

Water and sewage

Sugar and allied foodstuffs

Antibiotics and disinfectants

Marine biology

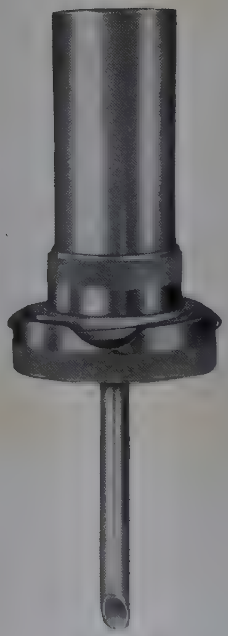
Beers, wines and soft drinks

Clinical fluids

Filter holders and sealing gaskets may be repeatedly autoclaved at 121°C.

See FD-350 et seq.

Filter holders for Carlson-Ford sheets see FD-421 et seq.



FD-350

FD-356

MISCELLANEOUS ITEMS

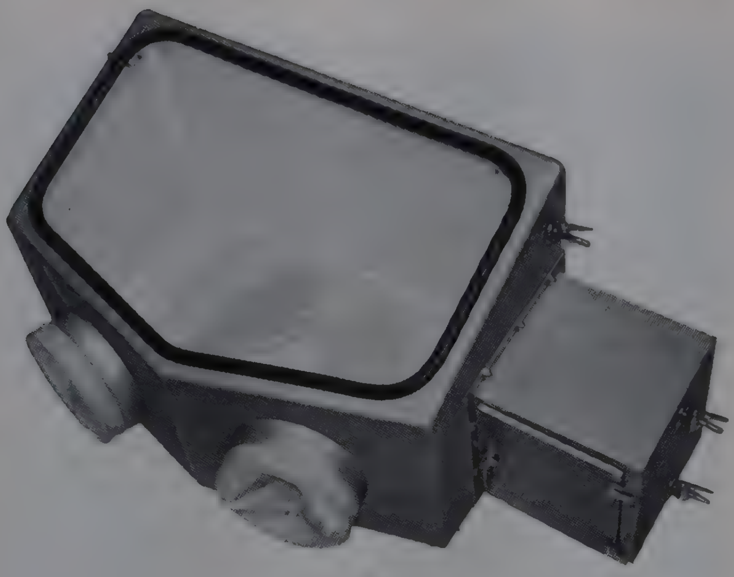
ALUMINIUM FOIL	see AL-100 et seq.
ASBESTOS GLOVES	see CP-770 et seq.
GLASS WOOL	see GR-150
LABELS	see LB-120 et seq.
STEAM STERILISERS	see SR-600 et seq.
STERILISING CABINET	see DK-640
STERILISING CONTAINERS	see SR-760 et seq.

RILE
STERILE
STERILE

LB-150

For full details and prices of the above items see entries in List No. sequence.

INOCULATION



MA-950

Gallenkamp
MANIPULATOR GLOVE BOX
with automatic air-lock loading hatch

Originally developed for handling low activity radio isotopes, this glove box has many applications in the field of microbiology where operators may to a large extent be protected from infection by micro organisms.

Toxic materials may be handled in dry powder form without danger from airborne particles.

Operations such as stirring, filtering, dispensing, gentle heating, etc. may be carried out in the glove box under controlled conditions.

The box and loading hatch are made from heavy gauge steel sheet, rustproofed and stove enamelled. All the corners of the box are radiused to permit easy cleaning. Rubber feet are fitted to the base. The large Perspex window is sealed in place by an air-tight gasket. Two glove ports at the front are fitted with ambidextrous rubber gauntlets held in place by stretching their beaded sleeve ends over the openings of the ports. Gloves are thus replaced easily and quickly but a double groove on each glove port prevents the gloves from being detached accidentally.

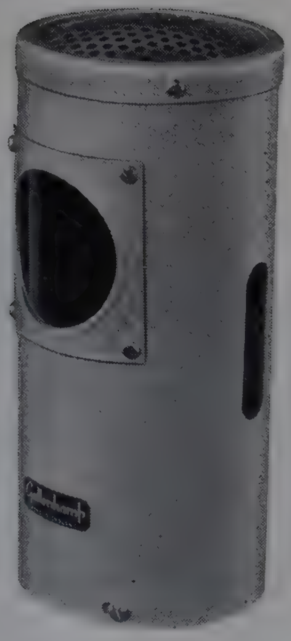
The loading hatch is in the form of an automatic air-lock with two air-tight doors interconnected by a neat interlocking mechanism to prevent either being opened until the other is correctly shut. Both the box and loading hatch are fitted with stopcocks for connection to dry air or inert gas supply.

External dimensions

Manipulator box (excluding hatch)	69 × 45 × 42 cm high
Loading hatch	22 × 22 × 21 cm high
Loading hatch door	15 × 16 cm
Glove ports	16·5 cm dia.
Top window	61 × 37 cm max.
Maximum width	102 cm

See MA-950 et seq.

Other MANIPULATOR BOXES and CLEAN AIR CABINET see MA-970 et seq.



CX-600

Gallenkamp
LOOP FLAMING INCINERATOR

A simple device for flame sterilising platinum loops without the danger of scattering infective materials such as bacteria or mould spores. The loop is inserted through the slit on the side of the case and can be observed in the flame through the mica window.

See CX-600.

CX-560

MISCELLANEOUS ITEMS	
BUNSEN BURNERS	see BX-020 et seq.
CULTURE BOTTLES	see CX-200 et seq.
NEEDLE AND WIRE HOLDER	see CX-560
PETRI DISHES	see CX-240 et seq.
PLATINUM-IRIDIUM WIRE	see CX-570
SYRINGES	see SY-410 et seq.

For full details and prices of the above items see entries in List No. sequence.

CULTIVATION

Gallenkamp CeCa

CONTROLLED ENVIRONMENT CULTURE APPARATUS

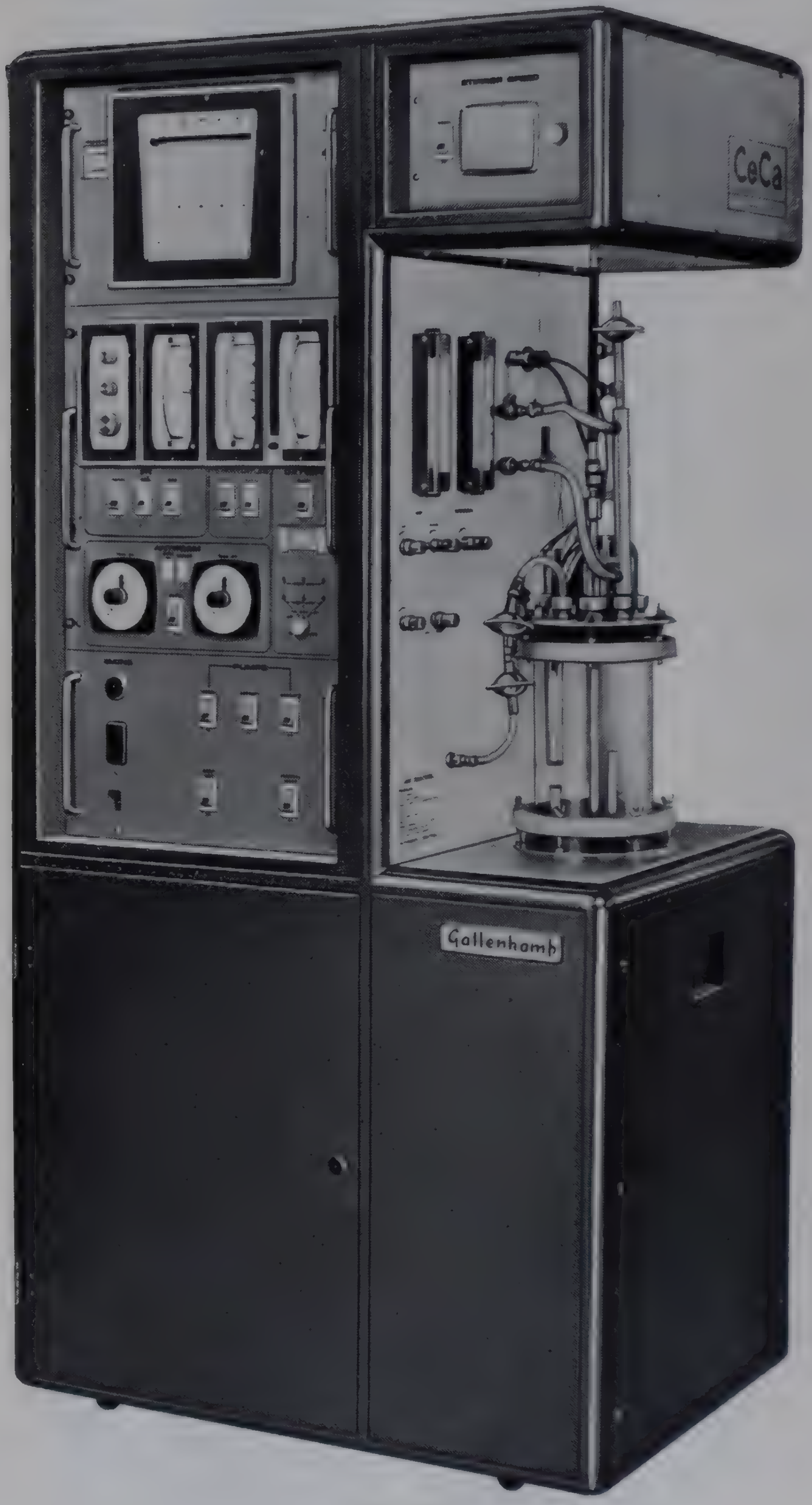
The fermenter, which has been designed in consultation with Professor S. J. Pirt of the Department of Microbiology, Queen Elizabeth College, London, has a working volume of 2 to 4 litres and is based on a type which has been proved suitable for growth of bacteria, fungi, algae, protozoa, animal tissue cells and plant tissue cells. The equipment is complete for batch or continuous-flow operation.

The fermenter assembly comprises the culture vessel, medium and harvest reservoirs and all associated sterile parts. The whole assembly can be fitted into a large laboratory autoclave, or alternatively, it can be easily dismantled at convenient points for autoclaving in smaller sections. It is designed to be easily connected, after sterilisation, to the instrument panel and stirrer drive. Features of the culture vessel are the many wide ports which allow maximum flexibility in attachment of feed lines and insertion of instrument probes. Stirring rate is continuously variable and accurately controlled in the range 300 to 1400 rev/min without loss of power at low speeds. High aeration efficiencies can be obtained.

The instrumentation provides control and recording of temperatures, pH and dissolved oxygen concentration. Antifoam is metered in at variable intervals.

In the design, stress has been placed on compactness, reliability in continuous operation and ease of assembly, dismantling and sterilising. The apparatus is the first commercially available chemostat continuous culture apparatus which can be "plugged in" for instant operation.

The field of use for the apparatus includes development of industrial fermentations, brewing research, vaccine production, studies on water pollution and effluent disposal, tissue cell culture, biochemical reactions, enzymic digestions, fundamental research on cell and microbe growth.



CX-650

DESIGN FEATURES

- **Accurate auto control and strip chart record of dissolved oxygen, temperature and pH**
- **Accurately controlled adjustable speed high power stirrer**
- **Pumped weir to eliminate accretion of filamentous growths**
- **Integral trolley withdraws for autoclaving complete system *in toto***

APPLICATIONS

- **Mass culture of bacteria, fungi, algae, protozoa, viruses and cultured plant and animal cells**
- **Studies on production of vaccines, antibiotics, enzymes and other microbial and cell products**
- **Teaching the techniques of fermentation and microbe cultivation**
- **Studies of brewery and dairy fermentations**
- **Small scale industrial production of microbes**
- **Studies of microbiological treatment of effluent and sewage**

Detailed specification and accessories see CX-650 et seq.

For full details and prices of the above items see entries in List No. sequence.

CULTIVATION (contd.)

IH-100

Gallenkamp ANHYDRIC INCUBATORS

FAN CONVECTION MODELS

A range of high quality anhydric incubators, for use in the fields of biology and microbiology, bacteriology, virology, epidemiology, pathology and biochemistry.

- **Temperature range 7degC above ambient to 100°C**
- **Direct reading *Compenstat* temperature control with safety thermostat**
- **Stainless steel interior**
- **Unitised control panel for easy servicing and recessed to minimise accidental alteration of controls**
- **Toughened glass inner door with neoprene gasket**
- **No water jacket leakage hazard**

Available in three sizes with total shelf areas from 0·5 to 1·5 m². See IH-100 et seq.

IH-400

Gallenkamp ORBITAL INCUBATORS

Compenstat controlled

For growing cultures of micro organisms and tissue cells under controlled conditions of temperature and agitation.

- **Up to 36 samples simultaneously incubated**
- ***Compenstat* control within ±0·5degC**
- **Built-in safety thermostat**
- **Reliable operation over long periods unattended**
- **Stepless control of speeds to 280 oscillations/min**

The platform moves with a circular orbital motion which minimises the accretion of material on the sides of the flasks and which avoids damaging cells by impact. The incubator is normally used for growth in air but the counterbalanced lid is fitted with a magnetic gasket and a tubulure is fitted in order that other atmospheres may be introduced. The window is double glazed to avoid condensation. See IH-400 et seq.

ORBITAL INCUBATOR, illuminated and refrigerated for photosynthetic studies of bacteria and algae—see IH-450.

For full details and prices of the above items see entries in List No. sequence.

CULTIVATION (contd.)

Gallenkamp COOLED INCUBATORS

Compenstat controlled

A range of refrigerated incubators with heaters for working at temperatures below, near to and above ambient temperature. Suitable for:

Micro organism culture studies
Biochemical oxygen demand (B.O.D.) testing
CO_2 incubation
Incubation serum studies
Enzyme testing
Tissue culture work
Plant growth
Immunology
and also for long term storage of samples.

The temperature inside the incubator is pulled down by the refrigerator and heated air, which is efficiently ducted by means of a fan, is used to hold the temperature at the value set by the operator.

COOLED INCUBATOR, temperature range approximately 0 to 45°C—see IH-270.

COOLED INCUBATOR, with **bright interior fluorescent illumination.** Temperature range approximately 10 to 45°C—see IH-280.

COOLED INCUBATOR, with **inner Perspex door and inlet nozzle** for introducing CO_2 enriched atmospheres—see IH-290.

AIR/CO_2 BLENDER—see IH-345.

IH-270

Gallenkamp SHAKING REACTION INCUBATORS

A 15 litre and a 70 litre bath capacity incubator with reciprocating mechanism for shaking speeds up to 200 oscillations/minute in temperatures up to 80°C. Available with a variety of container racks and accessories such as cooling coils and gabled lids. Widely used for shaken culture techniques.

- **Thermostatic control up to 80°C**
- **Variable shaking speeds to 200/min**
- **Variable stroke length**
- **Stainless steel construction**

SHAKING REACTION INCUBATOR, bath capacity 15 litres, temperature controlled by *Compenstat* to within 0·1degC—see IH-350.

SHAKING REACTION INCUBATOR, bath capacity 70 litres, temperature controlled by adjustable contact thermometer to within 0·2degC—see IH-370.

IH-350 with
IH-352 and WF-404

For full details and prices of the above items see entries in List No. sequence.

CULTIVATION (contd.)

WF-360

Gallenkamp

WATER AND STEAM BATHS

A very wide range of heating and cooling baths is offered from simple, single place aluminium and copper water and steam baths to large, general purpose, thermostatically controlled water baths with stainless steel interiors and racks for most biological applications.

These baths are fully described and illustrated under WATER BATHS and include the following selection:

WATER BATH, 10 litre capacity, stainless steel interior, *Compenstat* controlled for 100°C max. With induction motor stirrer—see WF-360.

WATER BATH, 15 litre capacity, stainless steel interior, *Compenstat* controlled for 100°C max.—see WF-400.

WATER BATH, 30 litre capacity, stainless steel interior, contact thermometer controlled for 100°C max.—see WF-455.

WATER BATH, 70 litre capacity, stainless steel interior, *Compenstat* controlled for 95°C max.—see WF-470.

COOLED THERMOSTATIC BATH, 35 litre capacity, with integral refrigerator and transistorised temperature control from −20°C to +50°C. Optionally available with built-in pump—see WF-720.

THERMOSTATIC WATER BATH, 20 litre capacity, comprising glass tank with 'Thermo Stirrer', temperature controlled to 90°C with fluctuation ±0·05degC—see WF-850.

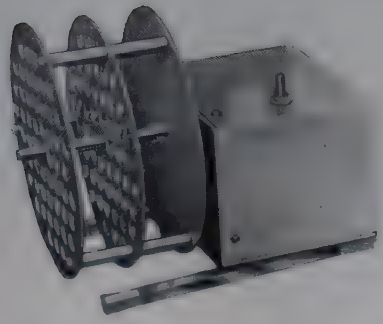
CX-500

Gallenkamp

ANAEROBIC CULTURE JAR

A modified McIntosh and Fildes jar, capacity approximately 4 litres, for the safe growth of anaerobes by utilising an oxygen removing catalyst which is active above 0°C. The cover is fitted with two needle valves for evacuation filling.

See CX-500.



CX-610

MISCELLANEOUS ITEMS

DEEP FREEZERS	see RJ-610 et seq.
DISSOLVED OXYGEN METER	see WP-720
REFRIGERATORS	see RJ-810 et seq.
ROLLER TUBE APPARATUS	see CX-610
THERMOGRAPHS	see TK-100 et seq.
ULTRAVIOLET LAMPS	see LH-530 et seq.

For full details and prices of the above items see entries in List No. sequence.

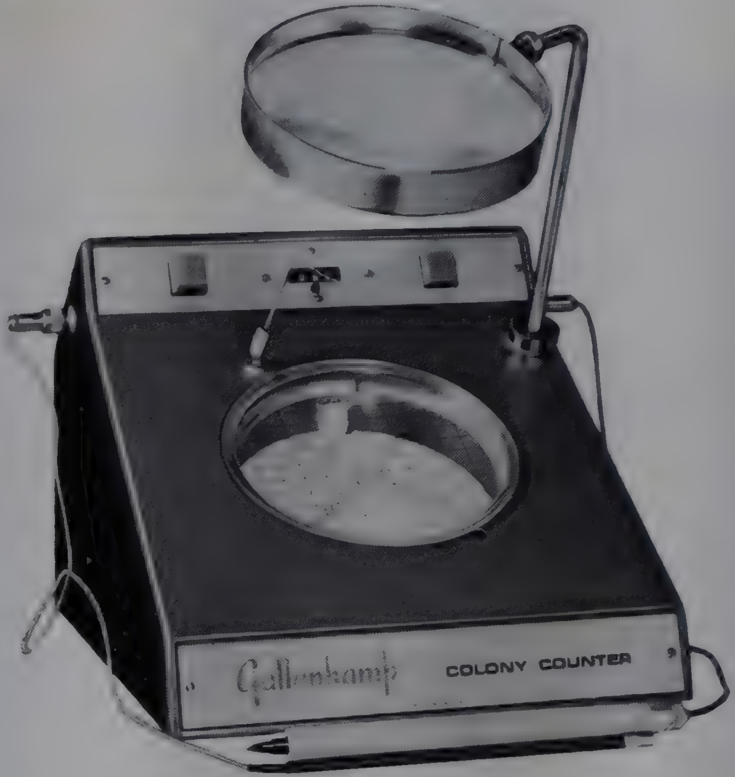
COUNTING AND EXAMINATION

Gallenkamp COLONY COUNTER

With transistorised digital counter for counting bacterial and mould colonies

- **Digital display of colony count**
- **Bright, dazzle free peripheral illumination**
- **Light and dark ground**
- **Contact and marker probes supplied**
- **Hand tally counter, field magnifier and Wolffhuegel graticule accessories**

The dish holder accepts all dishes, including those to BS 611, up to 12·4 cm dia. Contact needle electrodes are easily removed for sterilising. Marker probes may be loaded with black, red, blue or green cartridges.
See CX-300 et seq.



CX-300 with graticule CX-314 and magnifying lens CX-318

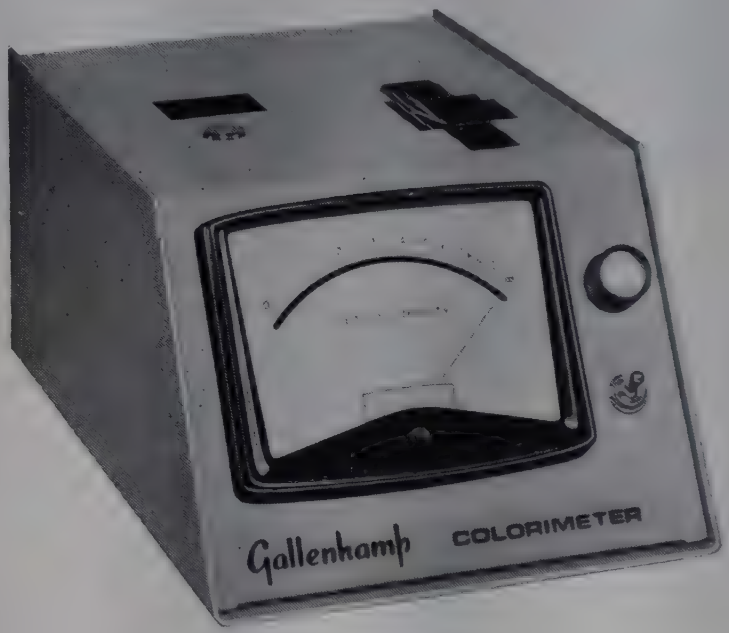
Gallenkamp COLORIMETER

- **Transistorised stabiliser circuit**
- **Rapid response—stable readings**
- **Mirror scale reads optical density direct**
- **Polypropylene 3-position cell holder**
- **Simple to operate and maintain**
- **Optional flowthrough cell**

Accuracy—about 1% by direct reading; better with calibration curve.

Stability—total drift over long periods less than 0·005 o.d. units after 10 minute warm-up period.

Sample heating—only about 5degC over a period of 2 hours.
Available with a range of colour filters, test cells, cell holders and adapters.
See CS-200 et seq.



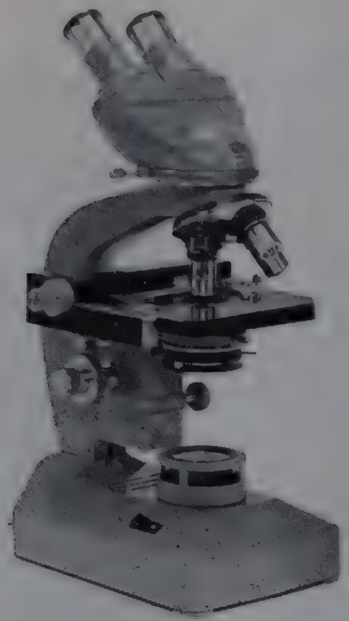
CS-200

CV-800

MISCELLANEOUS ITEMS	
COLONY ILLUMINATOR	see CX-290
GRATICULES	see MP-710 et seq.
HAEMACYTOMETERS	see MD-200 et seq.
PETRI DISHES	see CX-240 et seq.
STAINING EQUIPMENT	see HJ-300 et seq.
TALLY COUNTERS	see CV-800 et seq.

For full details and prices of the above items see entries in List No. sequence.

COUNTING AND EXAMINATION (contd.)



ML-140

Olympus
MODEL KHC MICROSCOPE

A low priced research microscope of modern design suitable for routine medical and biological studies and research.

- Inclined binocular head rotatable through 360°
- High quality optics
- Magnifications from ×40 to ×1000 with optics supplied
- Enclosed racks and pinions
- Coaxial coarse and fine focusing adjustment knobs
- Large built-in mechanical stage
- Pre-set focusing lock protects slides and objectives
- Built-in illuminator

See ML-140.

ML-192

Olympus
SERIES EH RESEARCH MICROSCOPES

High performance research microscopes which incorporate a light source giving full illumination regardless of changes in magnification.

- Preset focus lock protects slides and objectives
- Fine focus adjustment to 0·002 mm
- Built-in flexible Köhler illumination
- Wide range of optical elements

See ML-190 et seq.

ML-282

Olympus
MODEL CK INVERTED MICROSCOPE

A simplified microscope for routine examination of cultures in bottles, dishes or tubes.

- Image appears upright
- Convenient positioning of controls for minimum fatigue and simple operation
- Rack and pinion focusing
- Phase contrast accessory and polarising attachment available

See ML-280 et seq.

For full details and prices of the above items see entries in List No. sequence.

WASHING AND DRYING

Gallenkamp DRYING CABINET

A large capacity cabinet for rapid drying of glassware and samples at thermostatically controlled temperatures.

- **Maximum temperature 120°C**
- **Temperatures controlled by direct reading thermostat**
- **Toughened glass doors**

The heating elements, which are protected from spillage by baffles, are housed in the bottom compartment of the cabinet. Hot air convects rapidly through the cabinet interior and emerges through the adjustable ventilator at the top, carrying away with it moisture and other vapours.

An exhaust fan is available for fitting over the ventilator to increase the rate of moisture extraction. The oven has four fixed shelf positions and is supplied with two shelves.

Dimensions

	H	W	D
Internal	72 ×	64 ×	37 cm
External	107 ×	76 ×	38 cm

See OV-880.

SMALL DRYING CABINET, 100°C, internal dimensions 70 × 31 × 35 cm high—see WD-195.

OV-880 with OV-892

Gallenkamp GLASSWARE DRYERS

Single and multipoint dryers, with built-in heaters and motor driven fans, for the rapid drying of laboratory glassware especially cylinders and narrow-necked flasks.

Each dryer is fitted with an air inlet filter and heated, filtered air is forced through the holes in the apparatus support tubes. A good distribution of air over the inside of the apparatus is achieved and because the air is not recirculated a maximum drying rate is obtained. A safety thermostat protects the dryer against overheating due to accidental interruption of the air circulation and a switch in the heater circuit enables cold air to be circulated if required. See WD-200 et seq.

WD-200

MISCELLANEOUS ITEMS

APPARATUS TROLLEYS	see FV-250 et seq.
BOTTLE WASHERS	see WD-020 et seq.
CLEANING LIQUIDS	see CM-751 et seq.
DRAINING RACKS	see WD-170 et seq.
DRYING CLOTHS	see CM-520
PIPETTE WASHER	see WD-120
STAINLESS STEEL BUCKET	see BV-470
ULTRASONIC CLEANERS	see UL-150 et seq.

For full details and prices of the above items see entries in List No. sequence.

MICROCHEMICAL APPARATUS

Other apparatus suitable for microchemical purposes will be found under the following List Nos. in this catalogue.

AB-860 and AB-865	**Absorption tubes,** Pregl.
AB-920	**Absorption tube,** Flaschenträger.
BA-500 to BA-564	**Balances,** micro and semi-micro, *Mettler.*
BR-730	**Boats,** micro-combustion.
BW-634 to BW-786	**Burettes,** micro.
BX-085, BX-095, BX-285 and BX-485	**Burners,** micro
CF-200	**Centrifuge,** semi-micro.
CJ-005 to CJ-015	**Centrifuge tubes,** micro.
CK-180 to CM-250	**Chromatography** apparatus.
CS-200 to CS-283	**Colorimeter,** *Gallenkamp.*
DK-710	**Desiccator,** pistol pattern.
DK-725	**Drying apparatus,** *Gallenkamp.*
DT-760 and DT-765	**Distillation sets,** semi-micro.
DT-870	**Laboratory,** *Quickfit* semi-micro.
EJ-930	**Microtitration** apparatus, *Gallenkamp.*
FD-594 to FD-654	**Sintered filters,** Pregl and others.
FH-500	**Flame analyser,** *Gallenkamp.*
FJ-170 to FJ-196	**Flasks,** semi-micro.
HD-570 and HD-575	**Heating mantles.**
HR-100	**Micro hydrogenation** apparatus, *Gallenkamp.*
MD-010	**Micro haematocrit** centrifuge.
MD-120 to MD-150	**Microdiffusion** dishes and shaker.
MF-350	**Micro-melting point** apparatus, *Gallenkamp.*
MW-140 and MW-145	**Ebulliometer,** semi-micro, Heitler.
NR-410 to NR-691	**Nitrogen determination,** Kjeldahl.
PM-486 and PM-566	**Pipettes,** micro.
PR-355 and PR-365	**Plates** for spot analysis.
SJ-214 and SJ-216	**Spatulas,** Chattaway micro.

MK-050

BEAKERS, Ⓐ, **micro, tall pattern,** to BS 1428 Pt E2, borosilicate glass, for filter sticks, etc.

Capacity	7	20 ml	
Height	35	55 mm	
Ext. dia.	18	24 mm	
Ten	**£1·35**	**2·10**	*a*
Each	**£0·20**	**0·27**	

MK-055

BEAKERS, micro, squat form with lip, *Pyrex Brand* glass.

Capacity	5	10	25 ml	
Std. pack. qty.	60	60	120	
Std. pack	**£6·85**	**6·85**	**13·60**	*d*
Dozen	**£1·50**	**1·50**	**1·50**	
Each	**£0·20**	**0·20**	**0·20**	

MK-050

MK-055

MK-060

DESICCATOR, MICRO, with metal base and hemispherical glass cover. Contains a dished, polished metal sample cooling block which is mounted over a glass desiccant holder ... ... Each **£9·00** *b*

REPLACEMENT PART

MK-062 Glass cover ... ... Each **£0·40** *a*

MK-060

DK-710

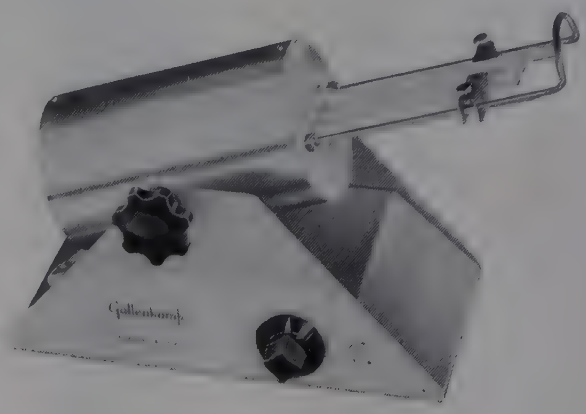
DESSICATOR, constant temperature vacuum, pistol pattern. For details see entry in List No. sequence.

All items on this page normally available from stock.

Gallenkamp MICRO SUBLIMATION APPARATUS

For purification by distillation and sublimation at temperatures up to 350°C.

- **For 2 to 20 mg samples—solid or liquid**
- **Accommodates three sample tubes**
- **Can be clamped at any angle up to 45°**



MK-140

HEATER BLOCK

The heater block is made of aluminium and is heated by a band heating element operating at mains voltage. An energy regulator enables the temperature to be controlled over the range 50°C to 350°C to within ±2degC.

SAMPLE TUBES

The heating block accommodates three glass tubes of 9 mm outside diameter and a thermometer. For best results the thin walled tubes MK-142 should be used, with the special capsules MK-144 to contain the samples. Sample weights in the range 2 to 20 mg are normally used and the samples can be either solid or liquid.

PROCEDURE

The precise details of procedure will vary according to the substance being treated but, in general the partially purified specimen is placed in a capsule in the closed end of a clean dry tube, a constriction is made near the open end of the tube, a cotton wool plug is inserted and the tube is evacuated to 0·01 torr or less. The specimen is then heated in the block at the desired temperature until distillation or sublimation is complete. The portion of the tube containing the purified material may then be cut out or, if desired, sealed off under vacuum. With liquid samples some fractionation is possible if a thin copper tube is placed around the glass tube where it projects from the heating block.

MK-140

HEATING BLOCK FOR MICRO DISTILLATION AND SUBLIMATION, *Gallenkamp*, as specification, with 10 sample tubes, 20 capsules, 'cold finger' and a thermometer. For a.c. single phase supplies only.

For 220/240V	Each	**£49·00**	*b*
For 200/210V	Each	**£50·00**	*bN*
For 110/120V	Each	**£50·00**	*bN*

When ordering please state voltage and frequency of supply.

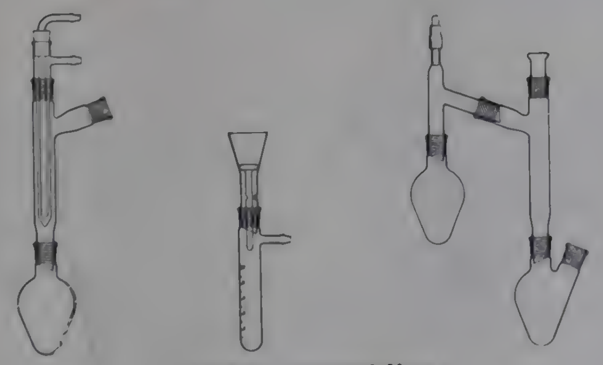
REPLACEMENT PARTS

MK-142	**Sample tubes,** thin walled ...	Pack of 10	**£0·30**	*a*
MK-144	**Capsules**	Pack of 10	**£0·25**	*a*
TJ-050	**Thermometer,** scale span 0–360°C. For price see entry in List No. sequence.			

For suitable vacuum pump see VB-104 et seq.

SMALL SCALE PREPARATIVE SETS

For educational and industrial organic chemistry

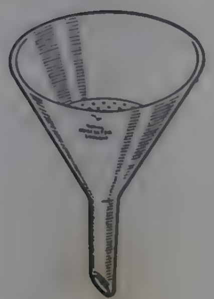


Typical assemblies

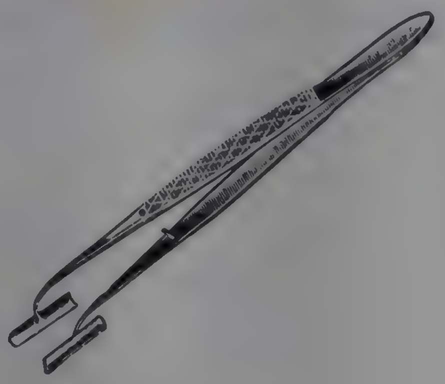
- **Semi-micro scale: 1 to 10 g product quantities**
- **Components have 14/15 interchangeable ground joints**
- **Suitable for a wide range of preparations**

For full details and prices see DT-760 and DT-765 in List No. sequence.

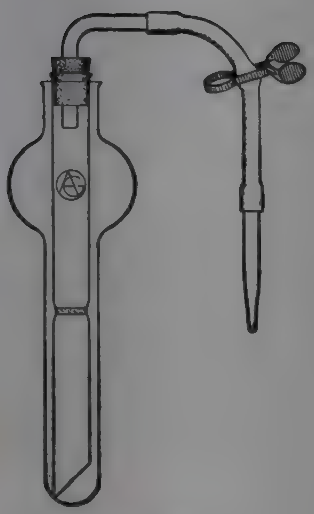
Items on this page normally available from stock except those coded *N.*



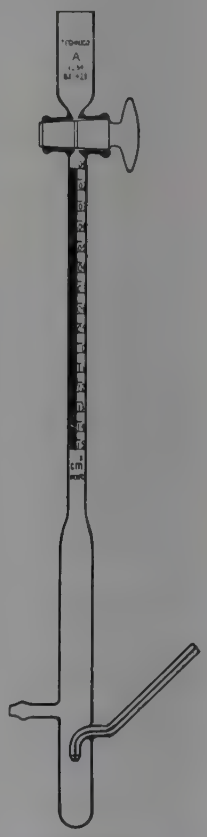
MK-150



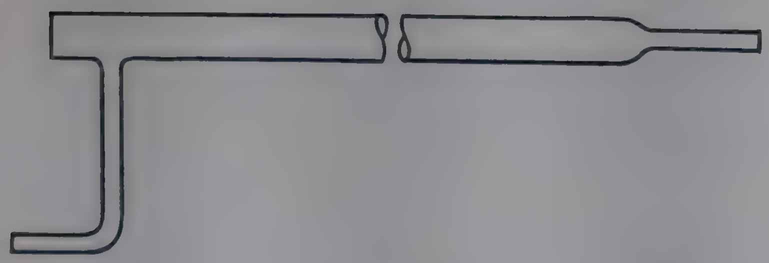
MK-175



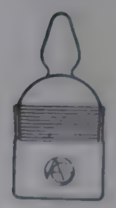
MK-190



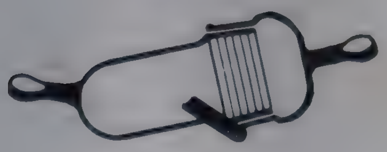
MK-230



MK-400



MK-430



MK-440

MK-150

FILTER FUNNELS, Hirsch type, *Royal Worcester* porcelain.

Top diameter	18·5	29	43	60 mm	
Filter plate diameter	8	8	11	20 mm	
Ten	**£1·70**	**2·20**	**2·90**	**3·90**	*d*
Each	**£0·24**	**0·28**	**0·35**	**0·44**	

MK-175

FORCEPS, chromium plated steel, 12·5 cm long, with bent tips and channel grips for filter sticks etc.
Ten **£8·40** Each **£0·94** *c*

MK-190

GAS GENERATOR, SEMI-MICRO, Ⓐ, for small quantities of gases. Comprises outer vessel, 150×19 mm dia., with bulb at the top and a loose fitting inner vessel, 150×13 mm dia., with a 10 mm dia. sintered glass support disk, porosity 0. Complete with rubber stopper, bend, clip and glass jet ... Ten **£12·80** Each **£1·45** *a*

MK-230

NITROMETER, micro, *Technico,* to BS 1428 Pt. D3. Capacity 1·5 cm³ subdivided in 0·01 cm³. With works certificate ... ... Each **£8·15** *a*

MK-400

TUBE, COMBUSTION, fused transparent silica, to BS 1428 Pt. A1, with side arm ... Each **£3·70** *m*

MK-410

TUBE, CARIUS, heavy wall glass, for sealed tube operations at temperatures up to 350°C, with one end closed. Length 350 mm, external diameter 11 mm.
Ten **£1·50** Each **£0·22** *m*

MK-430

WEIGHING BOTTLE, Pregl pattern, to BS 1428 Pt. H1, with ground-in stopper. Dimensions, approximately 8 mm high, 7 mm diameter.
Ten **£5·00** Each **£0·55** *a*

MK-440

WEIGHING PIG, Pregl pattern, with ground-on cap, handles and two feet. Length overall 55 mm, diameter 10 mm ... ... Ten **£9·20** Each **£1·02** *a*

DK-716

WEIGHING TUBE with long handled stopper, see entry in List No. sequence.

All items on this page normally available from stock.

MICROSCOPES

SECTION INDEX

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Dissection microscopes are listed also under page heading **DISSECTING.**
Stereoscopic magnifiers will be found under page heading **MAGNIFIERS.**

ACCESSORIES

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Eyepieces	497
Eyepiece graticules	506
Illuminators	499/507
Micromanipulators	505
Micrometer eyepieces	498

Item	Page
Microprojection screen	501
Objectives	496
Phase contrast outfit	500
Photomicrographic outfits	500/501
Stands	500
Transformer	499

Microscope slide and cover glasses will be found under **HISTOLOGY.**

MICROSCOPE OPTICS

The primary factors governing the performance of an objective are its magnification and its numerical aperture. Other factors, such as focal length and working distance are determined by these two primary factors.

MAGNIFICATION

All objectives listed in this catalogue, except those used with the inverted microscopes, are based on a mechanical tube length of 160 mm. By increasing the mechanical tube length, the initial magnification is increased according to

$$\text{Initial magnification} = \frac{\text{Tube length mm}}{\text{Focal length mm}}$$

Inclined monocular and binocular bodies are fitted with a correcting lens to compensate for the increase in mechanical tube length.

NUMERICAL APERTURE (N.A.)

The N.A. gives a measure of the resolving power of an objective. The greater the N.A. the greater the resolution. The **maximum useful** magnification obtainable from an objective is approximately 1000 times the N.A. Thus it can easily be calculated whether a particular combination of objective and eyepiece has reached or over-reached the effective power of the objective.

DEPTH OF FOCUS

The greater the N.A. of an objective, the smaller is the depth of field in which the object remains in focus. By reducing the N.A. and by stopping down the iris diaphragm, greater depth of focus is achieved at a cost of reduced resolution.

OLYMPUS MICROSCOPES

As exclusive Distributors in the United Kingdom only for biological microscopes made in Japan by Olympus Optical Co. Ltd. we are unable to offer for sale outside the U.K.

All lenses fitted to *Olympus* microscopes are hard coated for protection, maximum contrast and resolution.

All *Olympus* microscopes have an adjustment on the coarse focus which enables the user to vary the torque needed to rotate the knobs. It is only necessary to rotate one knob in the opposite direction from the other to tighten or loosen the movement.

LENS CODE

Applicable to optical elements of all *Olympus* microscopes.

Eyepieces

H	Huygenian.
R	Ramsden.
P	Compensated for chromatic aberration and distortion of objectives.
K	As P, but for use with high power or fluorite objectives.
WF	Wide field.
Bi	Binocular.
G	Paired Greenough type stereoscopic eyepieces.

Objectives

All objectives are corrected for chromatic aberration.

N	Normal dry system.
NZ	Normal dry system for zoom microscope.
S	Spring mounted.
I	Iris diaphragm.
Pl	Plan (aplanatic), compensated for spherical aberration.
Fl	Fluorite, semi-apochromatic.

Olympus
MODEL MIC MICROSCOPE

ML-050

A compact, inexpensive microscope for schools use. Supplied with plastics carrying case.

- **Inclined monocular head**
- **Fixed square stage with clips**
- **Built-in magnification control**
- **Stage focusing by rack and pinion**
- **Adjustable focus stop protects slide and objective**
- **Magnifications ×40 ×75 ×150 and ×300**

***ML-050**

MICROSCOPE, *Olympus* **Model MIC,** as specification.

Each **£17·30** *m*

NOTE: No accessory optical elements can be fitted to this microscope.

ACCESSORIES

ML-114	**Substage illuminator, Model LSK-111, plug in type ... ...**	For details and prices see entries in List No. sequence.
ML-801	**Replacement lamp ... ...**	

All items on this page normally available from stock.

Olympus
MODEL ST MICROSCOPE

A robust microscope especially recommended for simple routine work and for schools use. Supplied with carrying case.

- **Fixed square stage with clips**
- **Rack and pinion focus mechanism**
- **Rotating click-stop 5-aperture diaphragm**
- **Double nosepiece with click-stops**
- **Preset focusing stop avoids damage to slide or objective**
- **Magnifications from ×70 to ×600**
- **Optical elements—eyepieces H×7, P×15**
  objectives N×10, N×40

***ML-070**
MICROSCOPE, *Olympus* **Model ST,** as specification, including the four optical elements shown above.
Each **£28·85** *m*

For Lens Code see page 484.

ACCESSORY
ML-800 **Substage illuminator, Model LSK-II.** For details and price see entry in List No. sequence.

ML-070

Olympus
MODEL STN MICROSCOPE

This microscope is a Model ST but with optical elements selected and **approved by the Nuffield Biology Project** for the O-level biology course. Supplied in carrying case.

- **Fixed square stage with clips**
- **Rack and pinion focus mechanism**
- **Rotating click-stop 5-aperture diaphragm**
- **Double nosepiece with click-stops**
- **Preset focusing stop avoids damage to slide or objective**
- **Magnifications ×40 and ×100**
- **Optical elements—eyepiece H×10**
  objectives N×4, N×10

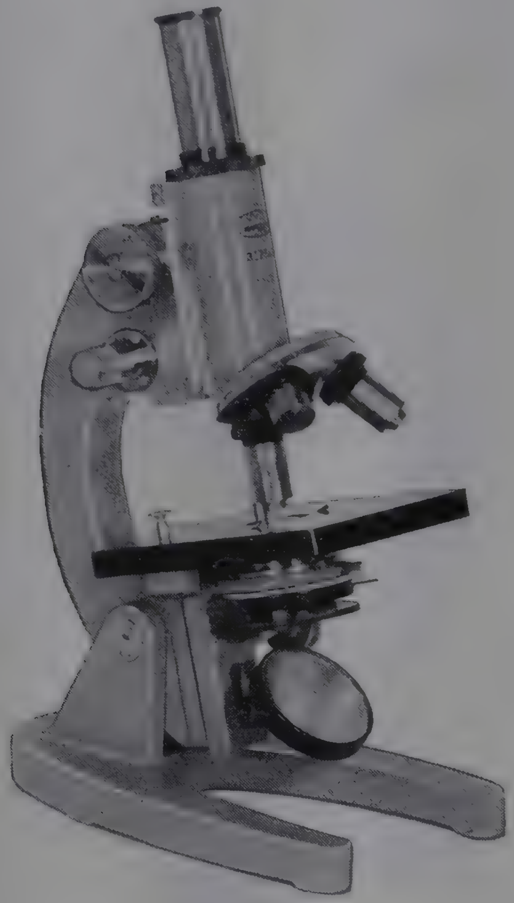
***ML-072**
MICROSCOPE, *Olympus* **Model STN,** as specification, including the three optical elements shown above.
Each **£20·75** *m*

For Lens Code see page 484.

ACCESSORIES

ML-500	**Objective, N×20**	See entries in List No. sequence.
ML-800	**Substage Illuminator, Model LSK-II**	

All items on this page normally available from stock.



ML-075

Olympus
MODEL HSC MICROSCOPE

A versatile microscope recommended for advanced students use.

- **Monocular body which can be inclined through 90°**
- **Triple nosepiece**
- **Coarse and fine focusing**
- **Fixed square stage, drilled to accept accessory mechanical stage**
- **Abbé condenser N.A. 1·25 with iris diaphragm**
- **Condenser focusing by rack and pinion**
- **Preset focusing and condenser stops**
- **Magnification from ×40 to approx. ×400**
- **Optical elements—eyepiece H×10—objectives N×4, N×10, N×40**

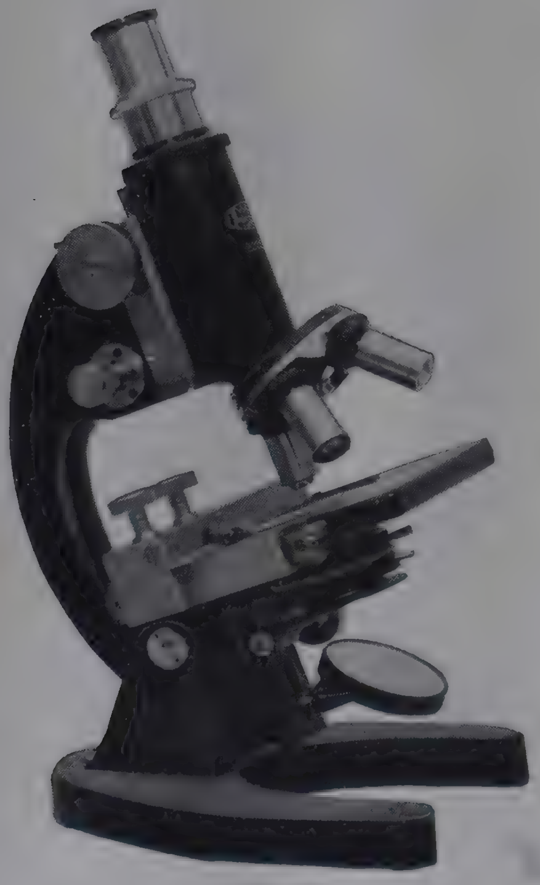
***ML-075**

MICROSCOPE, *Olympus* **Model HSC,** as specification, including the four optical elements shown above and carrying case ... ... Each **£46·25** *m*

For Lens Code see page 484.

ACCESSORIES

ML-112	**Graduated mechanical stage Model FM-2**	For details and prices see entries in List No. sequence.
ML-800	**Substage illuminator, Model LSK-II**	



ML-080

Olympus
MODEL GB MICROSCOPE

A general purpose, high performance microscope recommended for laboratory use and the teaching of advanced students.

- **Graduated draw tube**
- **Monocular head**
- **Quadruple nosepiece**
- **Coarse and fine focusing adjustment knobs**
- **Fixed square stage with built-in mechanical stage**
- **Condenser N.A. 1·25 with iris diaphragm**
- **Condenser focusing by rack and pinion**
- **Magnifications from ×50 to approx. ×1500**
- **Optical elements—eyepieces H×5, P×10, P×15 objectives N×10, N×40, S×100**

***ML-080**

MICROSCOPE, *Olympus* **Model GB,** as specification, including the six optical elements shown above and carrying case ... ... Each **£89·50** *m*

For Lens Code see page 484.

ACCESSORIES

ML-800	**Substage illuminator, Model LSK-II**	For details and prices see entries in List No. sequence.
HJ-520	**Immersion oil**	

All items on this page normally available from stock.

Olympus
SERIES K MICROSCOPES

A range of modern microscopes for school and college advanced biological laboratories with features normally restricted to expensive research models.

STAND

The stand is of rigid construction, built on a solid extra heavy cast base.

HEAD

The monocular head is inclined at 45° and is rotatable through 360°.

EYEPIECES

All eyepieces are hard coated for high transmission and quality definition.

The standard equipment includes a WF×10 wide field eyepiece. Alternative eyepieces are available and are listed on page 497.

NOSEPIECE

The quadruple click-stop nosepiece gives smooth accurate alignment.

OBJECTIVES

All achromatic objectives are parfocal and interchangeable and supplied in dust-proof plastics tubes. Alternative objectives are available and listed on page 496.

STAGE

A large size stage (110 × 140 mm) is predrilled and tapped to accommodate a mechanical stage which is available as an accessory.

SUBSTAGE

Abbé condenser N.A. 1·25 focusing by rack and pinion through a variable iris diaphragm with swing-out filter holder.

ILLUMINATION

A plano-concave mirror is included in the standard equipment. A 20W illuminator ML-114 or Universal Illuminator ML-802 with transformer are available as alternatives.

FOCUSING

Vertical movement of the stage, by conveniently located coaxial coarse and fine adjustment controls.

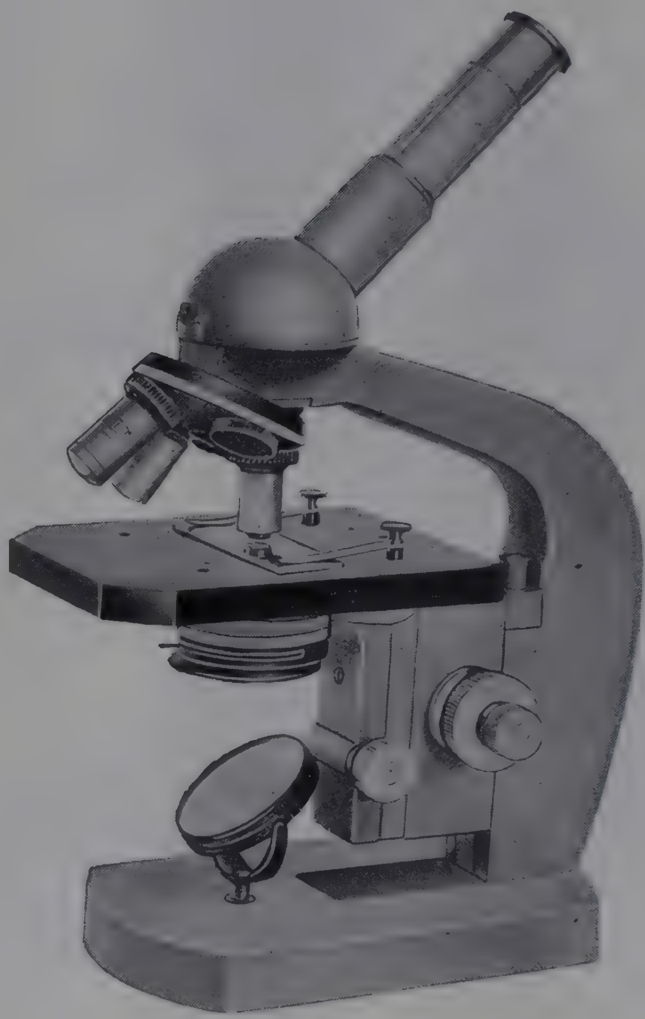
Coarse focus range 28 mm.

Fine focus range 2 mm.

For Lens Code see page 484.

NOTE: ML-100 is approved by the Nuffield Biology Project for the O-level biology course.

- **Co-axial coarse and fine focusing knobs**
- **Substage focusing by rack and pinion**
- **Inclined rotatable monocular head**
- **Quadruple nosepiece**
- **Large size stage to accommodate attachable mechanical stage**
- **Preset focusing lock protects slides and objectives**



ML-100 to **ML-104**

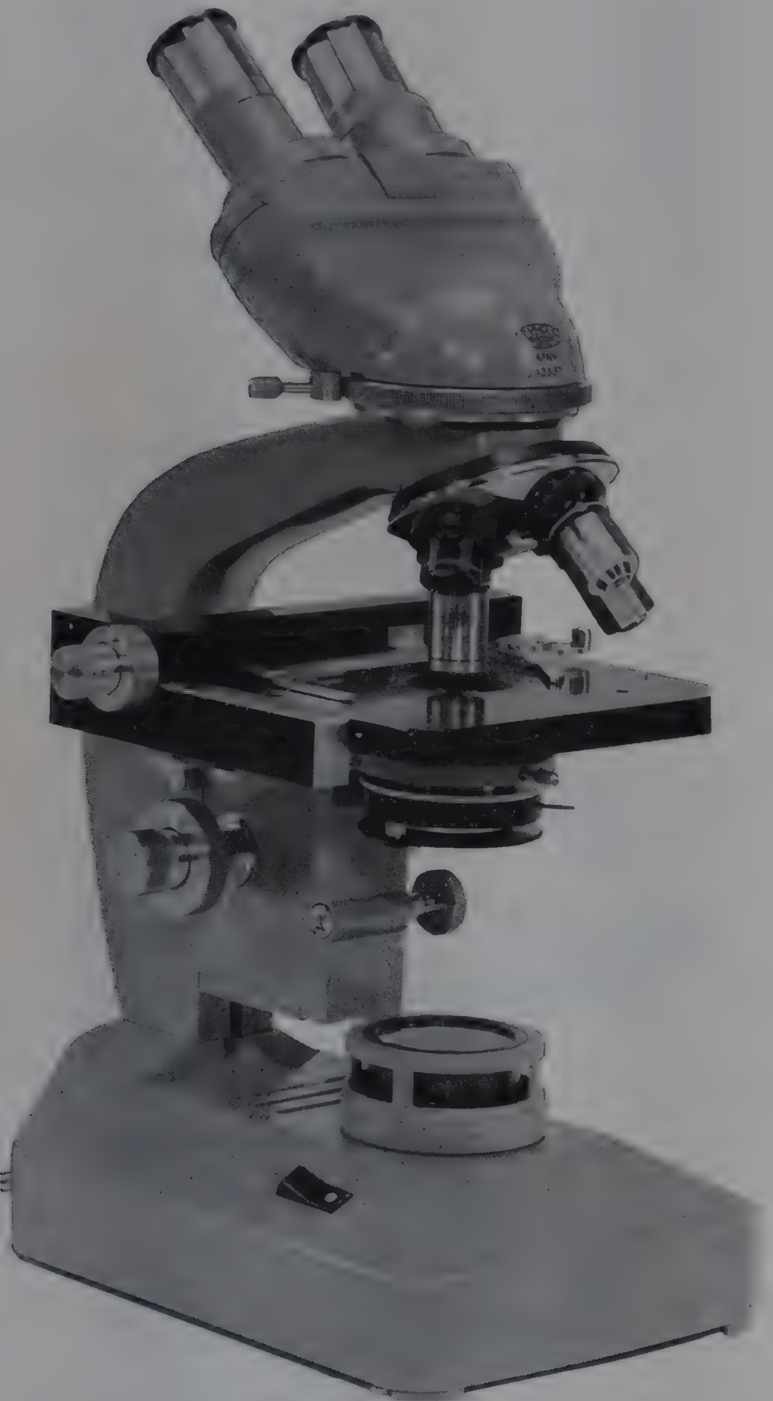
List No.	Model	Wide field eyepiece	Achromatic objectives	Abbé condenser	Magnification range	Each	
						£	
***ML-100**	KI	WF×10	N×4, N×10, N×40	N.A. 1·25	×40 to ×400	**55·00**	*m*
***ML-102**	KII	WF×10	N×10, N×40, S×100	N.A. 1·25	×100 to ×1000	**71·50**	*m*
***ML-104**	KIII	WF×10	N×4, N×10, N×40, S×100	N.A. 1·25	×40 to ×1000	**75·25**	*m*

ACCESSORIES

***ML-108**	**Carrying case,** wooden, fitted with lock and key. Each	**£5·75**	*m*
***ML-112**	**Graduated mechanical stage, Model FM-2,** range of movement 50×25 mm. Vernier scales reading to 0·1 mm ... ... Each	**£13·50**	*m*
***ML-114**	**Substage illuminator, Model LSK-III,** plug-in type, with 20W lamp and two replacements. Requires no transformer. For 240V a.c. or d.c. supplies. Each	**£4·60**	*m*

ML-801	**Replacement lamp,** 20W, for illuminator ML-114	For details and prices see entries in List No. sequence.
ML-802	**Universal light source, Model LSD,** with transformer ...	
ML-730	**Dark field condenser, Model DC**	
ML-860	**Phase contrast outfit** ...	
HJ-520	**Immersion oil**	

All items on this page normally available from stock.



ML-140

Olympus
MODEL KHC MICROSCOPE

A low priced research microscope of modern design suitable for routine medical and biological studies and research.

- **Inclined binocular head rotatable through 360°**
- **High quality optics**
- **Magnifications from × 40 to × 1000 with optics supplied**
- **Enclosed rack and pinion**
- **Coaxial coarse and fine focusing adjustment knobs**
- **Large built-in mechanical stage**
- **Pre-set focusing lock protects slides and objectives**
- **Built-in illuminator**

HEAD
Inclined binocular head, rotatable through 360° with interocular distance adjustable from 56 mm to 74 mm and individual acuity adjustment to facilitate sharpest possible image.

EYEPIECES
All eyepieces are hard coated for high transmission and quality definition.

NOSEPIECE
The quadruple click-stop nosepiece gives smooth accurate alignment.

OBJECTIVES
All achromatic objects are parfocal and interchangeable and supplied in dustproof plastics tubes.

STAGE
Horizontal mechanical stage (120 × 140 mm) with fine vernier graduation. Designed with convenient coaxial controls for slide manipulation through 30 × 70 mm.

SUBSTAGE
Abbé condenser N.A. 1·25 focusing by rack and pinion with variable iris diaphragm and swing-out filter holder and removable blue filter.

ILLUMINATION
The base of the microscope incorporates a pre-centred 20W lamp. Two replacements are supplied.

FOCUSING
Vertical movement of the stage is by coarse and fine focusing controls.

Coarse focus range 28 mm Fine focus range 2 mm

List No.	Model	Paired eyepieces	Achromatic objectives	Abbé condenser	Magnification	Each
***ML-140**	KHC	BiWF×10	N×4, N×10 N×40, S×100	N.A. 1·25	×40 to ×1000	£ **143·50** *m*

For Lens Code see page 484.

REPLACEMENT PART

***ML-148** **Lamp bulb,** 20W, for illuminator ... Each **£0·55** *m*

ACCESSORIES

The optical range can be extended by using additional eyepieces, objectives and condensers listed on pages 496 to 498.

***ML-150** **Vertical monocular head** for micrographic work. Screws on in place of binocular head ... Each **£4·75** *m*

***ML-152** **Plano-concave mirror** for use with external illuminator when the built-in illumination is insufficient. Screws on in place of illuminator condenser lens ... Each **£3·50** *m*

***ML-156** **Carrying case** ... ... Each **£7·75** *m*

HJ-520 **Immersion oil.** For details and price see entry in List No. sequence.

All items on this page normally available from stock.

Olympus
SERIES EH RESEARCH MICROSCOPES

High performance research microscopes incorporating built-in illuminators.

- **Preset focus lock protects slides and objectives**
- **Fine focus adjustment to 0·002 mm**
- **Built-in flexible Köhler illumination**
- **Wide range of optical elements**

STAND
The stand is of rigid construction with acid-resisting finish.

HEAD
Binocular or trinocular interchangeable heads rotating through 360°. On the binocular and trinocular models the interocular distance is adjustable from 58 mm to 78 mm and individual acuity adjustment is provided. Binocular models are supplied with an interchangeable vertical monocular head for photography.

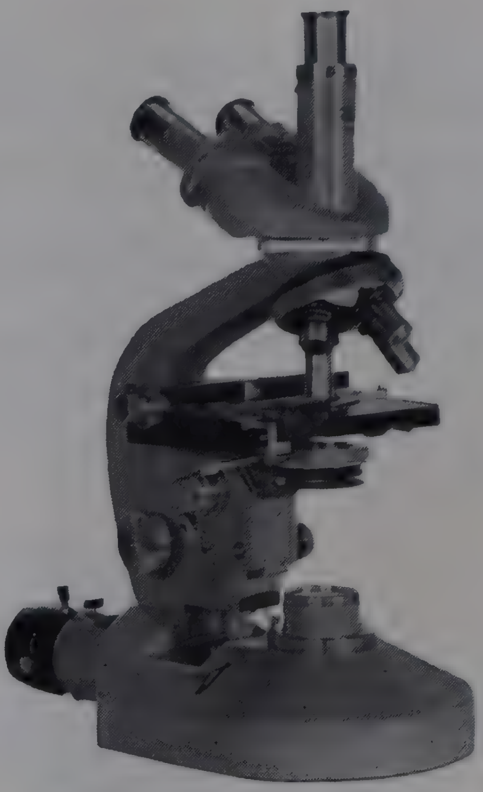
EYEPIECES
A wide range of high quality Huygenian, wide field and compensating eyepieces is available. All eyepieces are hard coated for high transmission and quality definition.

NOSEPIECE
The quintuple click-stop nosepiece is mounted on ball bearings for smooth and accurate alignment. Objective identification symbols are engraved on the nosepiece.

OBJECTIVES
All achromatic objectives are parfocal and interchangeable, and supplied in dust-proof plastics tubes.

STAGE
Horizontal mechanical stage (120 × 140 mm) with fine vernier graduation. Designed with convenient coaxial controls for slide manipulation through 50 × 70 mm.

SUBSTAGE
An Abbé condenser N.A. 1·25 focusing by rack and pinion with a 25 mm iris diaphragm, swing-out filter holder and blue filter.



ML-192 without transformer

ILLUMINATION
Precentred illuminating system at the base of the microscope with field diaphragm and compensating switch to give Köhler illumination to each objective.

FOCUSING
Vertical movement of stage by coarse and fine focusing controls.
Coarse focus range 31·8 mm.
Fine focus range 1·2 mm.
Scale calibrated in units of 0·002 mm.

When ordering please state voltage and frequency of supply.

ACCESSORIES

Eyepieces ... ... Objectives ... ... Condensers ... ... Phase contrast outfit ... ... Photomicrographic equipment ...	See pages 496 to 501

For immersion oil see HJ-520 in List No. sequence.
For replacement bulbs for illuminating system see ML-803 in List No. sequence.

For Lens Code see page 484.

RECOMMENDED ASSEMBLIES

List No.	Model	Eyepieces (paired)‡		Objectives	Head	Each	
***ML-190†**	EHC-Bi-I with transformer	BiP×7 BiWF×10 BiP×15		N×4 N×10 N×40 S×100	Binocular	£ 247·25	m
***ML-192**	EHC-Tri-I with transformer	BiP×7 BiWF×10 BiP×15	P×7 P×10 P×15 } for photo tube	N×4 N×10 N×40 S×100	Trinocular	276·75	m
***ML-194**	EHC-Tri-II with transformer	BiP×7 BiWF×10 BiP×15 BiK×20	P×7 P×10 P×15 } For photo tube	N×4 N×10 Fl×40 Fl×100	Trinocular	305·00	m
***ML-196**	EHC-Tri-III with transformer	BiP×7 BiWF×10 BiP×15 BiK×20	P×7 P×10 P×15 } For photo tube	Pl×4 Pl×10 Pl×40 Pl×100	Trinocular	370·00	m

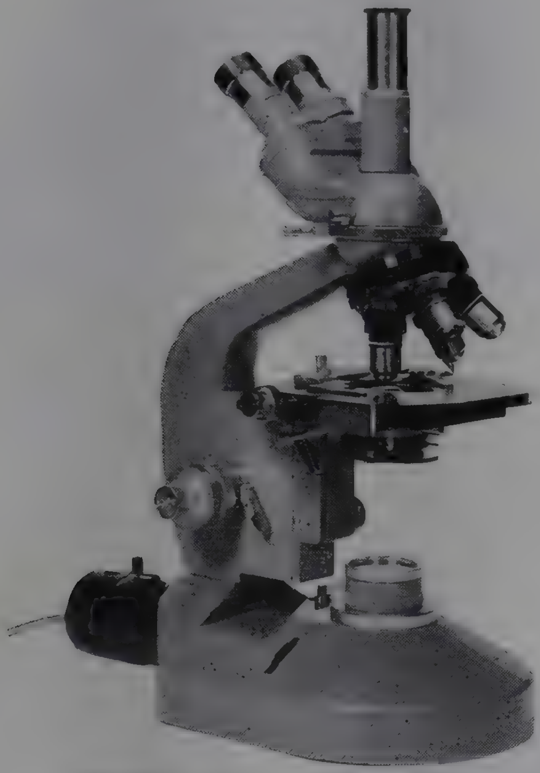
† Monocular head also supplied. † Eyepieces for photo tubes are not paired.

All items on this page normally available from stock.

Olympus
SERIES FH RESEARCH MICROSCOPES

A range of extremely high performance research microscopes incorporating an ultra sensitive stage focusing to 0·0005 mm.

- **Preset focus lock protects slides and objectives**
- **Fine focus adjustment to 0·0005 mm**
- **Built-in flexible Köhler illumination**
- **Wide range of optical elements**



ML-212 without transformer

STAND
The stand is of rigid construction, with acid-resisting finish.

HEAD
Binocular and trinocular interchangeable heads are rotatable through 360°. On the binocular and trinocular models the interocular distance is adjustable from 58 mm to 78 mm and individual acuity adjustment is provided. Binocular models are supplied with an interchangeable vertical monocular head for photography.

EYEPIECES
A wide range of the highest quality Huygenian, wide field and compensating eyepieces is available. All eyepieces are hard coated for high transmission and quality definition.

NOSEPIECE
The quintuple click-stop nosepiece is mounted on ball bearings for smooth and accurated alignment. Objective identification symbols are engraved on the nosepiece.

OBJECTIVES
All achromatic objectives are parfocal and interchangeable, and supplied in dust-proof plastics tubes.

STAGES
A square detachable mechanical stage is dovetailed to the body. Coaxial controls operate both directions of movement (50 mm × 70 mm) with verniers reading to 0·1 mm.

SUBSTAGE
An Abbé condenser N.A. 1·25 focusing by rack and pinion with a 25 mm iris diaphragm, swing-out filter holder and blue filter.

ILLUMINATION
Precentred illuminating system at the base of the microscope with field diaphragm and compensating switch to give Köhler illumination to each objective.

FOCUSING
Vertical movement of stage by coaxial coarse and fine controls located beneath the stage level. The coarse adjustment has a locking device.
Coarse adjustment—rack and pinion—range 32·5 mm.
Fine adjustment—balanced spring tension—range 2 mm.
Calibrated in units of 0·001 mm to permit measurement of thickness of specimen.
Sensitivity: 0·0005 mm.

When ordering please state voltage and frequency of supply.

ACCESSORIES

Eyepieces Objectives Condensers	Phase contrast outfit Photomicrographic equipment	See pages 496 to 501.

For immersion oil see HJ-520 in List No. sequence.
For replacement bulbs for illuminating system see ML-803 in List No. sequence.

For Lens Code see page 484.

RECOMMENDED ASSEMBLIES

List No.	Model	Eyepieces (paired) ‡		Objectives	Head	Each	
***ML-210†**	FHF-Bi-I with transformer	BiP × 7 BiWF × 10 BiP × 15		N × 4 N × 10 N × 40 S × 100	Binocular	£ **328·75**	*m*
***ML-212**	FHF-Tri-I with transformer	BiP × 7 BiWF × 10 BiP × 15	P × 7 P × 10 P × 15 } for photo tube	N × 4 N × 10 N × 40 S × 100	Trinocular	**357·25**	*m*
***ML-214**	FHF-Tri-II with transformer	BiP × 7 BiWF × 10 BiP × 15 BiK × 20	P × 7 P × 10 P × 15 } for photo tube	N × 4 N × 10 Fl × 40 Fl × 100	Trinocular	**385·00**	*m*
***ML-216**	FHF-Tri-III with transformer	BiP × 7 BiWF × 10 BiP × 15 BiK × 20	P × 7 P × 10 P × 15 } for photo tube	Pl × 4 Pl × 10 Pl × 40 Pl × 100	Trinocular	**445·00**	*m*

† Monocular head also supplied. ‡ Eyepieces for photo tubes are not paired.

All items on this page normally available from stock.

Olympus
PHOTOMAX PHOTOMICROSCOPE

BASIC BODY

Focusing unit. A coaxial system with rack and pinion coarse adjustment range 34 mm and geared fine movement of ±2 mm adjustable to 0·002 mm.

Illuminating unit. A built-in trans-illuminator with pre-centred bulb provides Köhler illumination through objectives ×1·3 to ×100 by a switch-over system. An epi-illuminator can be attached.

STAGE

Coaxial controls provide 70 mm horizontal and 32 mm vertical movement with fine vernier adjustment. The stage rotates through 360° and the stage clips are detachable.

VIEWING HEAD

Inclined at 22° for maximum comfort, the head maintains constant tube length at any interpupillary distance. The viewing eyepiece and the camera film are parfocal and specimens can be photographed while being observed. A knob selects the proportion of beam-splitting between the viewing head and the camera. An auxilliary revolving turret magnifier provides ×1, ×1·2, ×1·4 and ×1·8 total magnification without the need to change objectives or eyepieces.

NOSEPIECE

Two detachable rotating nosepieces, each holding up to five objectives, are supplied.

CONDENSERS

An achromatic Abbé condenser N.A. 1·4 and a swing-out top lens condenser N.A. 0·8 are fitted. The achromatic condenser can be rotated to achieve oblique illumination.

PHOTOGRAPHIC UNIT

Exposure system. Automatic exposure timing from 0·01 sec to 10 min with provision for longer exposures by manual timing.

Over exposure detection. An orange lamp lights when the shutter is open and a green lamp extinguishes to warn of over exposure.

Shutter release button. Actuates shutter so as to eliminate vibration, and film is then wound on automatically. A separate button actuates film wind without shutter operation. A red lamp lights when all the film has been exposed.

Sensitivity setting. Calibrated dials cover ASA speed ranges 6 to 3200 monochrome and 12 to 800 colour and ASA regulation range 0·7 to 1·4.

Colour temperature regulation. A null point meter, compensating filters and adjusting knob allow regulation of the light source colour temperature over the range 2854°K to 6000°K.

Cameras. Two standard 35 mm camera backs wiih automatic screens are provided. The screens allow the cameras to be interchanged when loaded with film. Polaroid, roll film and plate cameras are available.

EYEPIECES

Photography. Wide field, paired, compensated with mask. Magnifications ×10 and ×15 supplied.

Observation. Wide field, paired, compensated, magnification × 10 supplied.

OBJECTIVES

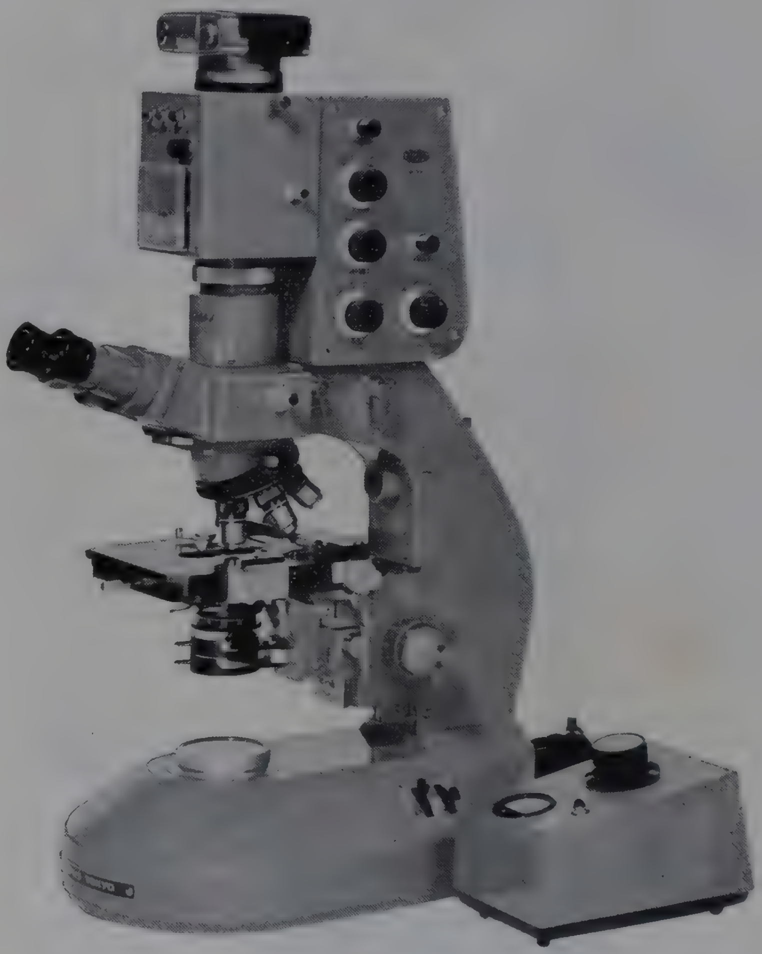
Plan achromatic, flat field ×4, ×10, ×20, ×40 and ×100 oil immersion supplied.

FILTERS

A selection of colour temperature compensation, neutral density, monochrome contrast and daylight observation filters is supplied.

A highly versatile microscope system which provides extremely accurate black and white or colour photographic records in the fields of biology and medicine.

- **Binocular viewing of specimens while photographing**
- **Precision photographic system with electronically controlled shutter**
- **Colour temperature regulation**
- **Clean, well laid out controls**
- **Film advanced automatically**



ML-240

***ML-240**

MICROSCOPE, *Olympus* **Photomax,** as specification including:
Main body with viewing head, two nosepieces and stage.
Substage condenser mount.
Achromatic Abbé and swing-out condensers.
Objectives ×4, ×10, ×20, ×40, and ×100.
Photography eyepieces ×10 and ×15.
Observation eyepieces ×10.
Photographic unit.
35 mm camera backs (2).
Illuminator and transformer.
Colour filters, light, medium and dark blue.
Neutral filters, 50%, 12% and 3% transparency.
Contrast filters, light green, yellow and blue.
Spare lamps.
Cable release.
Cargille oil.
Accessory container.
Plastics dust cover, instruction manual and certificate of inspection ... ... Each **£1975·00** m

All items on this page normally available from stock.

Olympus
Model CK INVERTED MICROSCOPE

- **Image appears upright**
- **Convenient positioning of controls for minimum fatigue and simple operation**
- **Rack and pinion focusing**
- **Phase contrast accessories for ×10 and ×20 objectives and polarizing attachment available**

ML-282

A simplified microscope for routine examination of cultures in bottles, dishes or tubes.

HEAD

Binocular or monocular, inclined at 45°.

EYEPIECES

Paired or single ×10.

NOSEPIECE

Triple nosepiece with click-stops for quick accurate centring of objectives.

OBJECTIVES

Achromatic, long working distance ×4 and ×10. Accessory ×20 objective available as optional extra.

STAGE

Large, plain stage 180×150 mm, with stage clips on pillars, height adjustable for holding petri dishes, culture flasks, etc. Side extension plates each measuring 140×70 mm facilitate manipulation of specimens.

ILLUMINATION

Compact illuminator slides on vertical pillar which can be attached to front or rear of stage. Incorporates helical focusing, centring screws for lamp, slide-in filters and iris diaphragm. Lamp is 6V, 12W, fed by a transformer in base of microscope.

FOCUSING

Single focusing system operated by large diameter paired knobs, gives 15 mm movement. The stage remains stationary and permits the contents of large containers to be examined.

MAGNIFICATION

Standard outfit gives ×40 and ×100. Accessory ×20 objective available for magnification of ×200.

***ML-280**

MICROSCOPE, *Olympus* **Inverted Model CK,** as specification with inclined **monocular** head, triple nosepiece, plain stage, single ×10 eyepiece, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220 and 240V a.c. supplies.
Each **£138·50** *m*

***ML-282**

MICROSCOPE, *Olympus* **Inverted Model CK,** as specification with inclined **binocular** head, triple nosepiece, plain stage, paired ×10 eyepieces, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220 and 240V a.c. supplies.
Each **£184·50** *m*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

***ML-284** **Bulb, 12W,** spare for ML-280 and ML-282. Each **£0·45** *m*

ACCESSORIES

***ML-286** **Objective, achromatic, long working distance, magnification ×20** ... ... Each **£6·90** *m*

***ML-288** **Phase contrast accessory for ×10 or ×20 objectives.** Each **£9·00** *m*

***ML-289** **Polarising attachment...** ... ... Each **£11·00** *m*

NOTE: The optical elements used with this model are not suitable for use with other *Olympus* microscopes.

All items on this page normally available from stock.

Olympus
SERIES X STEREOSCOPIC MICROSCOPES

For plant classification, entomology, anatomy, geology and other applications.

Binocular and trinocular stereoscopic wide field microscopes with magnification selector knobs. Fixed optics ensure the highest resolution and freedom from distortion in stereomicroscopy. Model with trinocular head is for photomicrography.

- **Erect stereoscopic image**
- **Individual interpupillary and diopter adjustment to compensate for personal visual acuity of user**
- **Rapid change of magnification**

ML-320 with ML-820

STAND

Robust stand with adjustable pillar.

HEAD

The inclined binocular head permits a natural viewing position and reduces user fatigue.

EYEPIECES

Wide field eyepieces G×10 and G×20 provided.

STAGE

The stage is provided with clips and clear glass and opal glass plates. The working depth between the stage and the objective varies from 47 to 90 mm depending upon magnification.

MAGNIFICATION

The drum selector gives five different magnifications simply by turning a knob.

***ML-310**

MICROSCOPE, *Olympus* **Model X,** as specification with N×1 objective. Includes fitted case with lock and key ... ... Each **£166·00** *m*

***ML-320**

MICROSCOPE, *Olympus* **Model X-Tr,** as ML-310 but including trinocular head and ×10 parfocal eyepiece for photomicrography and a fixed NX1 objective. Each **£214·00** *m*

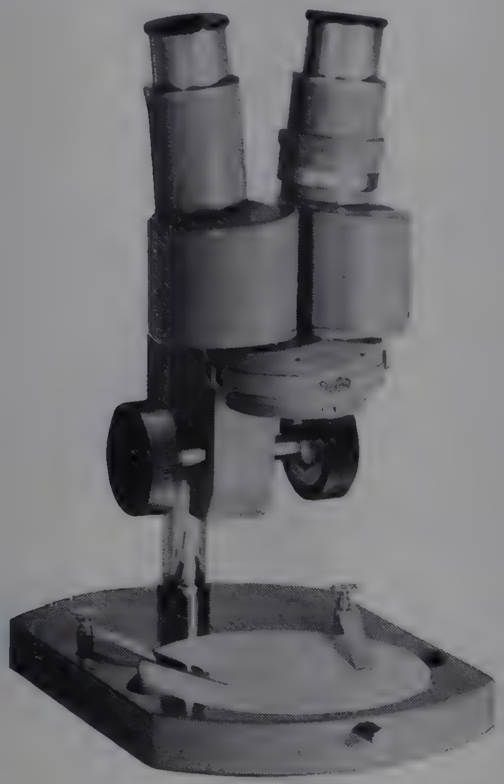
ACCESSORIES

***ML-312**	**Objective,** N×2 for use with microscope ML-310 only.	Each **£21·25** *m*
ML-804	**Illuminator, Model LSG** ...	For details and prices see entries in List No. sequence.
ML-820	**Trans-illuminating substage base**	
ML-823	**Iris diaphragm** for ML-820 ...	
ML-830	**Universal stand, Model VS-IV**...	
ML-900	**Photomicrographic apparatus, Model PM6**	

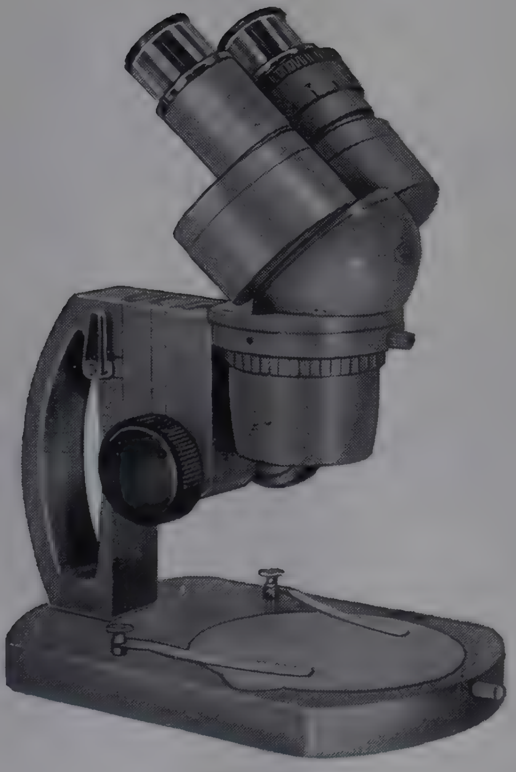
For Lens Code see page 484.

Objectives	G×10 Eyepieces		G×20 Eyepieces	
	Magnification range	Field of view (mm dia.)	Magnification range	Field of view (mm dia.)
N×1	× 6·3 to ×40	32 to 5·0	×12·6 to ×80	16 to 2·5
N×2	×12·6 to ×80	16 to 2·5	×25·2 to ×160	8 to 1·25

All items on this page normally available from stock.



ML-330



ML-340

Olympus
LOW POWER STEREOSCOPIC MICROSCOPES MODELS VA-II & VT-II

Low cost stereoscopic microscopes with distortion-free optics. These functional microscopes are valuable in the fields of science, education and medicine. Approved by the Nuffield Biology Project for the O-level biology course.

- **Stereoscopic viewing minimises eye-strain**
- **Natural, vivid images are erect and unreversed**
- **Optical elements are hard-coated for high transmission**

STAND

Acid-resistant and chromium-plated with rubber bumpers. Model VT-II incorporates a hand-grip stand for correct and safe handling.

HEAD

Binocular head with interpupillary adjustment. Detaches from stand for use on ML-830 Universal stand and ML-347 long-arm stand.

EYEPIECES

Independent focusing of left eyepiece provides means of obtaining critically sharp images. Paired G×10 eyepieces provide large, distortion-free field.

OBJECTIVES

Model VA-II. The paired parfocal N×1 and N×2 objectives are interchangeable by a rapid "click-lock" method. They are so mounted as to provide long working distances with an aperture adequate for high resolution.

Model VT-II. Incorporates turret with twin paired objectives for instantaneous magnification change.

STAGE

Flush-mounted glass plate with screw lock; large size stage clips.

FOCUSING

Rack and pinion focus mechanism, range 50 mm.

***ML-330**

MICROSCOPE, *Olympus* **Model VA-II,** as specification, including optical elements. Supplied with vinyl dust cover and fitted hardwood case with lock and key.
Each **£52·05** *m*

***ML-340**

MICROSCOPE, *Olympus* **Model VT-II,** as specification, including optical elements without carrying case.
Each **£57·25** *m*

For Lens Code see page 484.

ACCESSORIES

***ML-345**	**Carrying case for ML-340 ... ...**	**Each £5·50** *m*
ML-650	**Eyepieces ... ...**	**See entries in List No. sequence.**
ML-804	**Epi-illuminator Model LSG ...**	
ML-820	**Trans-illuminating substage base**	
ML-823	**Iris diaphragm for ML-820 ...**	
ML-830	**Universal stand Model VS-IV**	

Long-arm stand for use with ML-330 and ML-340—see ML-347 entry in Addenda.

MAGNIFICATION AND FIELD OF VIEW CHART

Objective	Working distance	Wide field eyepiece G×10		Wide field eyepiece G×15		Wide field eyepiece G×20	
		Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)
N×1	128 mm	×10	20	×15	15	×20	10
N×2	78 mm	×20	10	×30	7·5	×40	5

All items on this page normally available from stock.

Olympus
MODEL SZ-III STEREOSCOPIC ZOOM MICROSCOPE

A stereoscopic prismatic zoom microscope with a zoom ratio of 5·7 for the study of plant and animal anatomy.

- **Continuous magnification from ×7 to ×40 without defocusing**
- **Alternative optical elements provide magnification ranges from ×3·5 to ×160**
- **Perfect stereoscopic and erect images**

STAND
Durable acid-resistant finish.

HEAD
Binocular head inclined at 45° and rotatable through 360° with individual diopter and inter-pupillary adjustments on each eyepiece. Magnification ratio indicated on graduated ring.

EYEPIECES
Wide field G×10 eyepieces supplied with standard equipment.

OBJECTIVES
A built-in NZ×1 objective is supplied with the standard equipment.

Conversion lenses for alternative magnifications are listed under accessories below.

STAGE
Flush-mounted glass plate with screw lock; large size stage clips.

FOCUSING
Single focusing movement by rack and pinion mechanism.

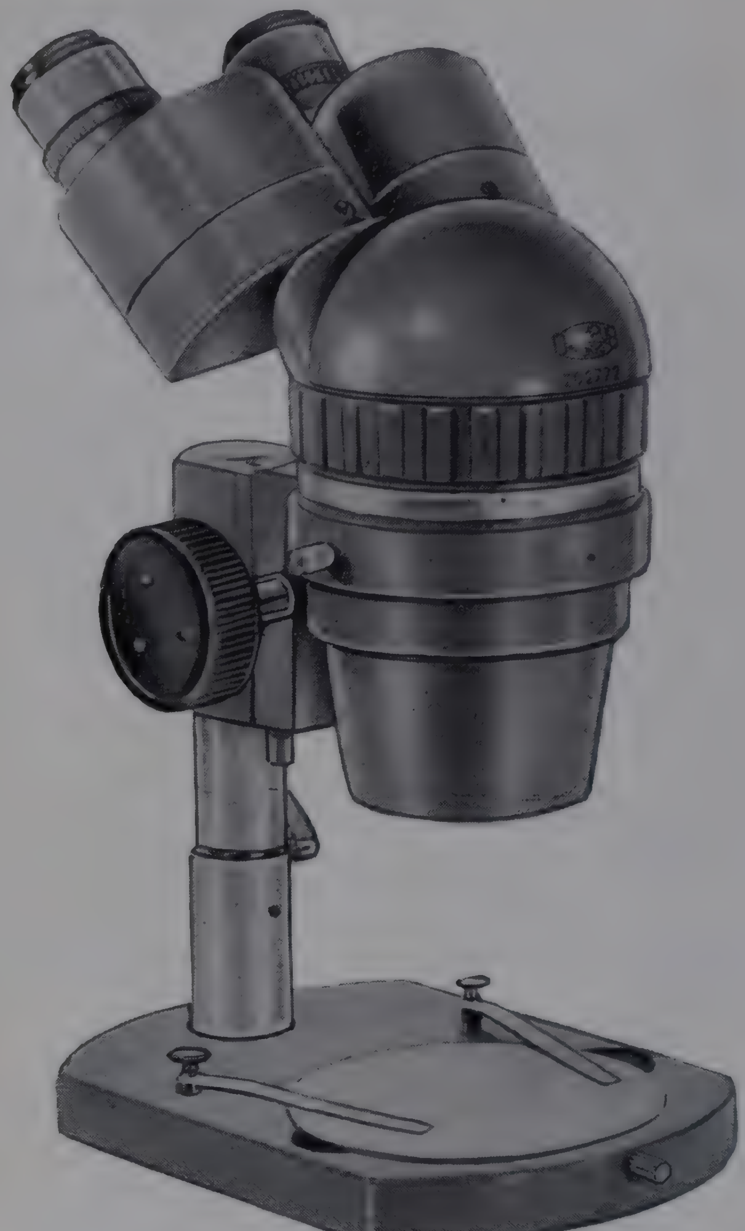
***ML-350**

MICROSCOPE, *Olympus* **Model SZ-III,** as specification, with clear and opaque glass stage plates, eyepiece caps, eyepiece shades, plastics dust cover and wooden cabinet ... ... Each **£154·50** *m*

ACCESSORIES

***ML-352**	**Conversion lens, ×0·5 with extension pillar.**	Each	**£15·50**	*m*
***ML-354**	**Conversion lens, ×0·75**	Each	**£6·40**	*m*
***ML-356**	**Conversion lens, ×1·5...**	Each	**£8·50**	*m*
***ML-358**	**Conversion lens, ×2**	Each	**£8·50**	*m*
ML-650	**Eyepieces, G×20 paired**	See entries in List No. sequence.		
ML-680	**Micrometer eyepiece**			
ML-804	**Epi-illuminator, Model LSG-II** ...			
ML-820	**Trans-illuminating substage base** ...			
ML-823	**Iris diaphragm for ML-820**			
ML-830	**Universal stand Model VS-IV** ...			

For Lens Code see page 484.



ML-350

MAGNIFICATION AND FIELD OF VIEW CHART

Objective assembly		G×10 Eyepieces		G×20 Eyepieces	
Conversion lens	Working distance	Magnification ranges	Field of view (mm dia.)	Magnification ranges	Field of view (mm dia.)
×0·5	166 mm	× 3·5 to ×20	62·9 to 11·0	× 7 to ×40	34·8 to 6·1
×0·75	111 mm	× 5·3 to ×30	41·9 to 7·3	×10·5 to ×60	23·2 to 4·1
None	97 mm	× 7 to ×40	31·4 to 5·5	×14 to ×80	17·4 to 3·1
×1·5	52 mm	×10·5 to ×60	21·0 to 3·7	×21 to ×120	11·6 to 2·0
×2	36 mm	×14 to ×80	15·6 to 2·8	×28 to ×160	8·7 to 1·5

All items on this page normally available from stock.

Olympus OBJECTIVES for Biological Microscopes

All objectives listed below are suitable for all *Olympus* microscopes except those requiring special objectives which are then listed under accessories for individual models.

All objectives are corrected for chromatic aberration and are parfocal, interchangeable and fluoride coated for maximum contrast and resolution.

All objectives (except those for stereoscopic microscopes) are colour coded.

For explanation of Lens Code see page 484.

No.	Type	Individual magnification	Numerical aperture	Focal length mm	Working distance mm	N.A. Condenser	Remarks	Code	Each	
	Normal								£	
***ML-500**	Dry system	×4	0·10	29·2	35·0	1·25		N	**3·75**	m
		×10	0·25	15·8	5·6	1·25		N	**4·60**	m
		×20	0·40	8·1	1·55	1·25		N	**6·90**	m
		×40	0·65	4·4	0·56	1·25		N	**8·95**	m
		×40	0·65	4·4	0·49	1·25	see Note 3	N	**8·95**	m
		×60	0·80	2·8	0·26	1·25		N	**10·00**	m
***ML-504**	**Iris Diaphragm** Oil immersion	×100	1·30	1·8	0·14	Dark field condenser	For dark field work	N.I	**22·50**	m
***ML-506**	**Spring Mounted** Dry system	×40	0·65	4·4	0·56	1·25	Avoids slide breakage	N.S	**12·40**	m
	Oil immersion	×100	1·30	1·8	0·14	1·25	Avoids slide breakage	S	**20·15**	m
***ML-530**	**Plan** Dry system	×1·3 (see Note 2)	0·03	40·3	38·68	0·22	No spherical aberration	Pl	**13·55**	m
		×2 (see Note 2)	0·05	44·1	42·20	0·22	,,	Pl	**14·75**	m
		×4	0·10	31·3	5·78	1·25	,,	Pl	**14·75**	m
		×10	0·25	14·3	0·84	1·25	,,	Pl	**17·00**	m
		×20	0·40	8·1	0·73	1·25	,,	Pl	**22·50**	m
		×40	0·63	4·3	0·24	1·25	,, Spring mounted	Pl.S	**31·75**	m
	Oil immersion	×100	1·25	1·7	0·17	1·25	,,	Pl.S	**77·50**	m
***ML-550**	**Semi-apochromatic** (Fluorite) Dry system	×40	0·75	4·4	0·49	1·25		Fl	**22·50**	m
	Oil immersion (See Note 1)	×100	1·30	1·7	0·11	or 1·4	with iris diaphragm	Fl.I	**41·75**	m

NOTE 1: Semi-apochromatic objectives (fluorite) are highly corrected for colour aberration; the amount of the aberration $< \frac{1}{10}\lambda$ for every colour. They are very suitable for taking colour photographs.

NOTE 2: Low power objectives ML-530 × 1·3 and × 2 should be used with special condenser ML-720 which has a N.A. of 0·22.

NOTE 3: For use when object is not covered with a cover glass.

All items on this page normally available from stock.

Olympus EYEPIECES for Biological Microscopes

All eyepieces listed in the table below are suitable for all *Olympus* microscopes except those requiring special eyepieces which are then listed under accessories for individual models.

All eyepieces are hard coated for high transmission and quality definition.

For explanation of Lens Code see page 484.

No.	Type	Magnification	Focal length mm	Field No.	Code	Remarks	Each	
	Single eyepieces			(See note below)			£	
***ML-600**	Huygenian	×5	50	21	H	Especially effective with low power objectives	2·30	m
		×7	36	18	H		2·30	m
		×10	25	13	H		2·30	m
***ML-610**	Compensation	×5	50	18	P	Compensate for chromatic aberration distortion of objective	5·75	m
		×7	36	18	P		5·75	m
		×10	25	13	P		5·75	m
		×10†	25	13	P		5·75	m
		×15	16·7	9·5	P		5·75	m
		×20	12·5	7·5	K	For use with high power or fluorite objectives	6·75	m
***ML-630**	Wide field	×10	25	18	WF	Provide large flat field of view	5·75	m
		×15	16·7	12	WF		5·75	m
***ML-634**	For phototube	×7	36	18	P		5·75	m
		×10	25	13	P		5·75	m
		×15	16·7	9·5	P		5·75	m
							Pair	
***ML-640**	**Binocular eyepieces** Compensation	×7	36	18	BiP	Supplied in pairs	11·50	m
		×10	25	13	BiP		11·50	m
		×15	16·7	9·5	BiP		11·50	m
		×20	12·5	7·5	BiK		13·50	m
***ML-642**	Wide field	×10	25	18	BiWF	Supplied in pairs	13·50	m
		×15	16·7	12	BiWF		13·50	m

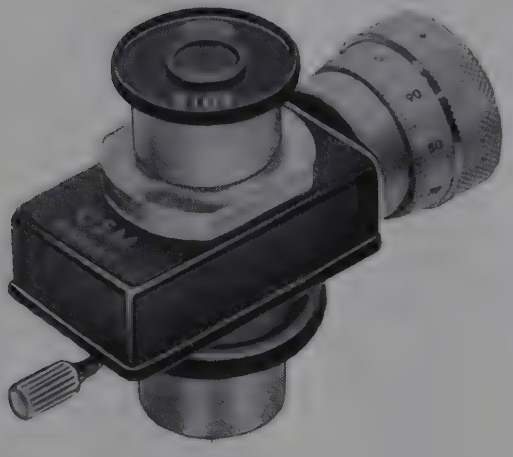
† This eyepiece has a movable pointer for indicating details of specimens.

No.	Type	Magnification	Focal length mm	Field No.	Code	Pair	
***ML-650**	**For Stereoscopic Microscopes** Wide field	×10	25	20	G	10·65	m
		×15	16·7	13	G	10·65	m
		×20	12·5	10	G	10·65	m

NOTE: Field No. is the product of the magnifying power of the objective and the diameter of the field of view.

All items on this page normally available from stock.

Olympus
MICROMETER EYEPIECES



ML-660

*ML-660

MICROMETER EYEPIECE, Filar, *Olympus* **Model OSM,** magnification ×10. Can be inserted into the eyepiece sleeve on a monocular, binocular or trinocular head, after removal of the auxiliary lens. An accurate measurement of 0·0001 mm is possible when using an ×100 objective ... ... Each **£27·00** *m*

*ML-670

COMPENSATION MICROMETER EYEPIECE, *Olympus,* 10 mm/100. Magnification ×7. Focal length 36 mm. Field number 18 ... ... Each **£7·95** *m*

*ML-674

COMPENSATION MICROMETER EYEPIECE, wide field, *Olympus,* 10 mm/100. Magnification ×10. Focal length 25 mm. Field number 18... Each **£7·95** *m*

NOTE: Details of suitable 19 mm dia. graticules—see EYEPIECE GRATICULES MP-710 et seq. in List No. sequence.

*ML-680

MICROMETER EYEPIECE, G×10, with 10 mm linear graticule divided into 100 ... ... Each **£17·00** *m*

Olympus CONDENSERS

Five types of *Olympus* condenser are available to satisfy varied requirements. All have an external diameter of 36·8 mm.

*ML-700

CONDENSER, *Olympus,* **Abbé type,** N.A. 1·25, with variable iris diaphragm ... ... Each **£10·25** *m*

*ML-702

CONDENSER, *Olympus,* **Abbé type,** N.A. 1·40, with variable iris diaphragm. A 3-element condenser which is more highly corrected than ML-700 and is recommended for use with high power fluorite and planachromat objectives ... ... Each **£12·40** *m*

*ML-710

CONDENSER, *Olympus,* **swing-out,** N.A. 0·9–0·25, with variable iris diaphragm. Useful where low and medium power objectives are used in conjunction with external illuminator when difficulty may be experienced in obtaining a fully illuminated field ... Each **£14·75** *m*

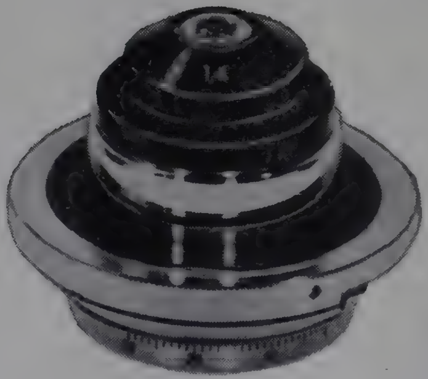
*ML-720

CONDENSER, *Olympus,* N.A. 0·22 for use only with ×1·3 and ×2 achromatic objectives ... Each **£6·80** *m*

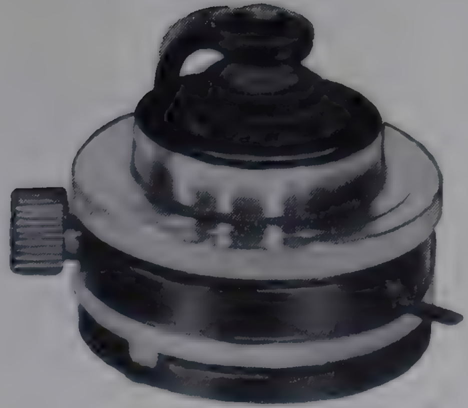
*ML-730

CONDENSER, dark-field, *Olympus,* **Model DC,** for observation of Brownian movement of colloids, etc. For oil immersion ×100 applications, objectives ML-504 or ML-550 must be used ... ... Each **£13·50** *m*

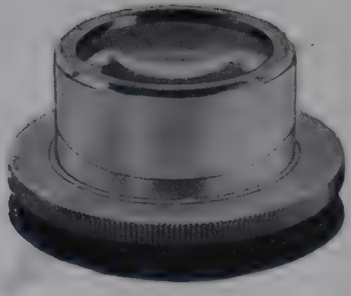
ML-700



ML-702



ML-710



ML-720

ML-730

All items on this page normally available from stock.

Olympus ILLUMINATORS

*ML-800

ILLUMINATOR, Substage, *Olympus* **Model LSK-II.** With 20W lamp and two spares; requires no transformer. For use with microscopes ML-070, ML-072, ML-075 and ML-080. For 240V a.c. or d.c. supplies. Each **£4·60** *m*

***ML-801 Replacement lamp, 20W** ... ... Each **£0·45** *m*

*ML-802

ILLUMINATOR, Universal, *Olympus* **Model LSD,** a mains powered, external illuminator with fully adjustable light intensity and focusing. For use with mirror illuminators and suitable for Köhler illumination. Includes adjustable output transformer in ventilated case fitted with voltmeter and pilot lamp and two spare lamps. For 240V a.c. single phase supplies ... ... Each **£29·85** *m*

***ML-803 Replacement lamp, 30W** ... ... Each **£0·45** *m*

*ML-804

EPI-ILLUMINATOR, *Olympus* **Model LSG-II,** for stereoscopic microscopes. With light focusing facility and adjustable output transformer in ventilated case fitted with pilot lamp. Includes two spare lamps. For 240V a.c. single phase supplies ... ... Each **£24·75** *m*

When ordering please state List No. of microscope for which ML-804 is required.

***ML-805 Replacement lamp, 12W** ... ... Each **£0·45** *m*

*ML-806

ILLUMINATOR, *Olympus* **Model VL-LF,** with fluorescent tube for stereoscopic microscopes. Includes choke for 240V a.c. single phase supplies ... Each **£38·00** *m*

***ML-807 Replacement fluorescent tube** ... Each **£3·45** *m*

*ML-810

ILLUMINATOR, *Olympus* **Model HLS-II.** A bright fluorescent light source for fluorescent microscopy. Comprises a 250W high pressure mercury discharge tube, five excitation filters and four pairs of eyepiece filters. For 240V a.c. single phase supplies ... ... Each **£403·50** *m*

REPLACEMENT PART

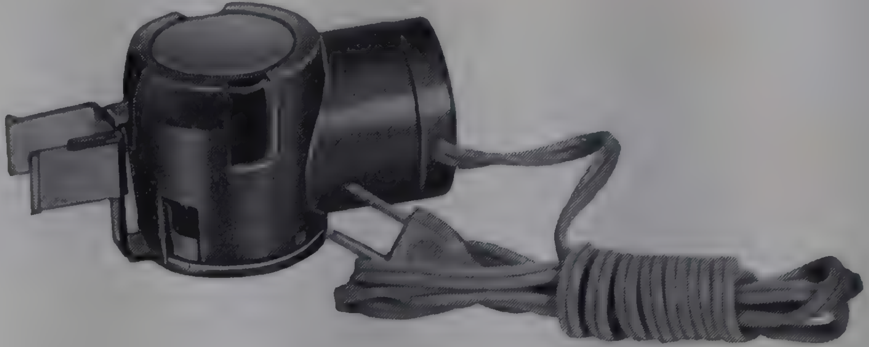
***ML-812 Discharge tube, 250W** ... ... Each **£34·00** *m*

ACCESSORIES

***ML-814 Tank,** for copper sulphate solution ... Each **£9·25** *m*

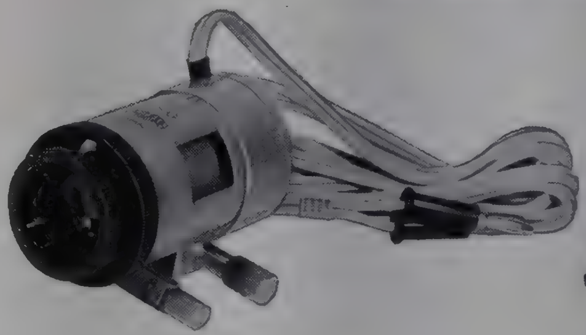
***ML-815 Condenser,** dark field, for low magnification. Each **£22·50** *m*

***ML-816 Tube filter** assembly with eight filters... Each **£113·00** *m*



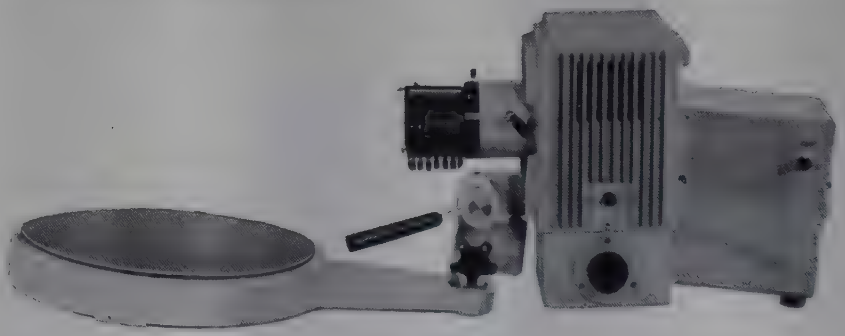
ML-800

ML-802
without transformer



ML-804
without transformer

ML-806
without choke



ML-810

Olympus TRANSFORMER

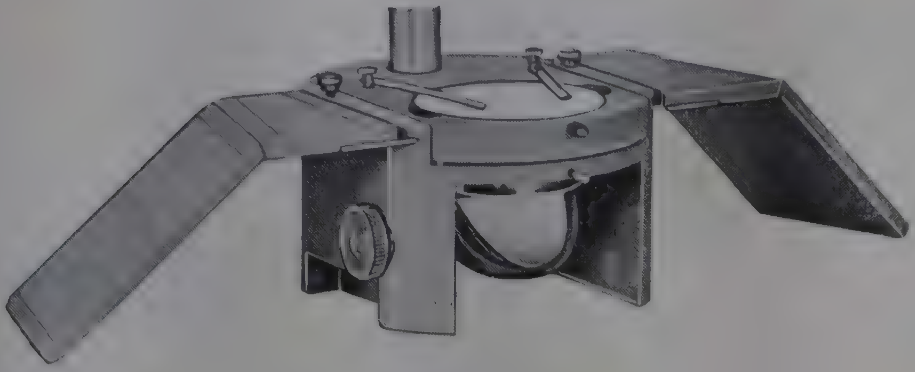
*ML-818

TRANSFORMER, *Olympus* **Model TE-II,** variable output, for use with microscopes Series EH and FH. Mounted in ventilated case fitted with voltmeter and pilot lamp. For 240V single phase supplies, maximum output 6V 5A ... ... Each **£17·25** *m*

ML-818

When ordering electrical accessories please state voltage and frequency of supply.

All items on this page normally available from stock.



ML-820

Olympus STANDS FOR STEREOSCOPIC MICROSCOPES

*ML-820

TRANS-ILLUMINATING SUBSTAGE BASE, *Olympus*, with fork-mounted adjustable mirror with polished metal finish on one side for use with lamps and matt white finish on the other for use with daylight. A 20W illuminator is incorporated in the back of the stand. Complete with inclined arm rests and two spare lamps. For 240V a.c. or d.c. supplies ... ... Each **£19·90** *m*

REPLACEMENT PARTS AND ACCESSORIES

*ML-821	Replacement lamp, 20W	Each	£0·45	*m*
*ML-823	Iris diaphragm for ML-820	Each	£6·40	*m*

When ordering please state voltage and frequency of supply.

*ML-830

STAND, Universal, Model VS-IV, for examining large objects with any *Olympus* stereoscopic microscope. Each **£32·00** *m*

ML-860

Olympus PHASE CONTRAST OUTFIT

Phase contrast equipment is used for the study of transparent specimens, such as living cells or materials which are not easily stained.

*ML-860

PHASE CONTRAST OUTFIT, *Olympus* **Model PB,** positive phase, low absorption. Comprises four objectives ×10, ×20, ×40 and ×100, one substage condenser assembly, one centring telescope and one green filter. In wood cabinet ... ... Each **£85·90** *m*

Olympus PHOTOMICROGRAPHIC OUTFITS

- **Pre-cock shutter prevents vibration and ensures clear pictures**
- **Specimen may be observed while photographing**
- **35 mm full-frame format**
- **Suitable for all eyepieces except ×5**
- **Facility for attaching exposure meter**
- **Can take whole field of view with total magnification of film = 1/3 × total magnification of microscope**

The instrument incorporates a 3-position sliding prism:

1. White position — all light to viewing eyepiece.
2. Green position — 20% light to eyepiece, 80% to film.
3. Yellow position — all light to exposure meter head.

The camera is fitted with automatic film stop and cable release. Shutter speeds range from 1 to 1/50 sec and B. The adapter fits all standard biological microscopes.

ML-900

*ML-900

PHOTOMICROGRAPHIC OUTFIT, *Olympus* **Model PM6,** as specification ... ... Each **£60·50** *m*

*ML-904

PHOTOMICROGRAPHIC OUTFIT, *Olympus* **Model PM7.** Similar to ML-900 but with facility for changing the camera back while loaded with film. The viewing eyepiece has High—Low light intensity lever. Supplied with two camera backs. In wood cabinet. Each **£112·75** *m*

All items on this page normally available from stock.

***ML-940**
EXPOSURE METER, *Olympus* **Model EMM-V,** direct reading, measuring a wide range of light intensity independent of colour and also for use as a colour temperature meter. The luminous intensity of light incident on the window of a photographic device, or at the plane where a photo-sensitive plate or film should be placed, is measured ... ... Each **£101·50** *m*

OLYMPUS EMM-V

ML-940

Olympus
AUTOMATIC PHOTOMICROGRAPHIC OUTFIT

- **Fits microscope with standard vertical eye-tube.**
- **Supplied for use with 35 mm film.**

***ML-945**
PHOTOMICROGRAPHIC OUTFIT, automatic, *Olympus* **Model PMS-II,** with electronically controlled shutter which has a manual override. Shutter speeds $\frac{1}{1000}$ to 10 seconds. Includes facility for colour temperature adjustment. Supplied with two 35 mm (36 × 24 mm) interchangeable camera backs ... Each **£502·25** *m*

NOTE: ML-945 is also available for use with roll film, dry plates or *Polaroid* film—details on request.

ML-945 with ML-192 and ML-940

Olympus
MICROPROJECTION SCREEN

For group viewing and optical comparison.

- **Fits any microscope with vertical tube or trinocular head**
- **Instantly attached or removed using the clamp screw**
- **Eyepieces easily changed**
- **The hood may be removed to allow a tracing of the image to be made**

SCREEN
85 mm diameter ground glass inclined at 10° to the vertical plane.

MAGNIFICATION
Magnification of projected image is × $\frac{2}{3}$ magnification of the microscope.

ILLUMINATION
The screen is suitable for low and medium power objectives only and a powerful light source such as ML-802 must be used.

***ML-950**
MICROPROJECTION SCREEN, *Olympus* **Model MPS,** as specification, fitted with attachable metal hood.
Each **£28·85** *m*

ML-950

All items on this page normally available from stock.

PRIOR SOLITAIRE MONOCULAR MICROSCOPES

A range of modern microscopes selected as being suitable for use in school and college biological laboratories.

- **Inclined monocular head**
- **Triple nosepiece**
- **Fixed square stage with clips**
- **Substage focusing**
- **Uniform subject illumination from built-in mains lamp**
- **Components fully interchangeable between models**
- **Graduated mechanical stage available**

MM-156

OBJECTIVES

Magnification	Focal length mm	Numerical Aperture	Working distance mm
×5	24	0·12	27·0
×10	16	0·18	16·5
×42	4	0·70	0·6
×95	2	1·25	oil immersion

The ×42 and ×95 objectives are protected by spring loaded mounts.

MM-152

MICROSCOPE, *Prior Solitaire*, as specification with inclined monocular head, ×6 and ×10 Huygenian eyepieces, ×10 and ×42 objectives in revolving nosepiece, Abbé condenser in adjustable rack and pinion substage mount, 25W 220/240V lamp and collecting lens and plastics dust cover ... ... Each **£69·60** *f*

MM-154

MICROSCOPE, *Prior Solitaire*, as MM-152 above with additional ×95 oil immersion objective.
Each **£82·80** *f*

MM-156

MICROSCOPE, *Prior Solitaire*, as specification, with inclined monocular head, ×6 and ×10 Huygenian eyepieces, ×5, ×10 and ×42 objectives in revolving nosepiece, modified Abbé condenser with swing out top lens for wide field illumination, adjustable rack and pinion condenser substage mount, 25W 220/240V lamp and collecting lens and plastics dust cover.
Each **£78·10** *f*

Illuminating lamps for other voltages available.

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

MM-160 **Lamp bulb,** 25W 220/240V supplies. Pack of 3 **£0·70** *f*

ACCESSORIES

MM-162 **Graduated mechanical stage,** horizontal movement 65 mm, vertical movement 25 mm, vernier reading to 0·1 mm ... ... Each **£15·50** *f*

HJ-520 **Immersion oil.** For details and price see entry in List No. sequence.

PRIOR SOLITAIRE BINOCULAR MICROSCOPES

- **Inclined binocular head**
- **Quadruple nosepiece**
- **Graduated mechanical stage**
- **Centring substage condenser**
- **Uniform subject illumination from built-in mains lamp**
- **Achromatic and dark ground condensers, Köhler illumination and upright eye-tube available**

MM-172

OBJECTIVES

Magnification	Focal length mm	Numerical aperture	Working distance mm
×10	16	0·28	5·5
×42	4	0·70	0·6
×105	1·8	1·30	oil immersion

The ×42 and ×105 objectives are protected by spring loaded mounts.

MM-170
MICROSCOPE, *Prior Solitaire*, as specification, with inclined binocular head, paired ×6 and ×10 Huygenian eyepieces, ×10 and ×42 objectives in quadruple nosepiece, built-in graduated mechanical stage, Abbé condenser in adjustable rack and pinion substage mount with centring device, 25W 220/240V lamp and collecting lens and plastics dust cover. In fitted wood cabinet.
Each **£133·85** *f*

MM-172
MICROSCOPE, *Prior Solitaire*, as MM-170 but with Aplanatic condenser and ×105 oil immersion lens.
Each **£157·85** *f*

Illuminating lamps for other voltages available.

When ordering please state voltage and frequency of supply.

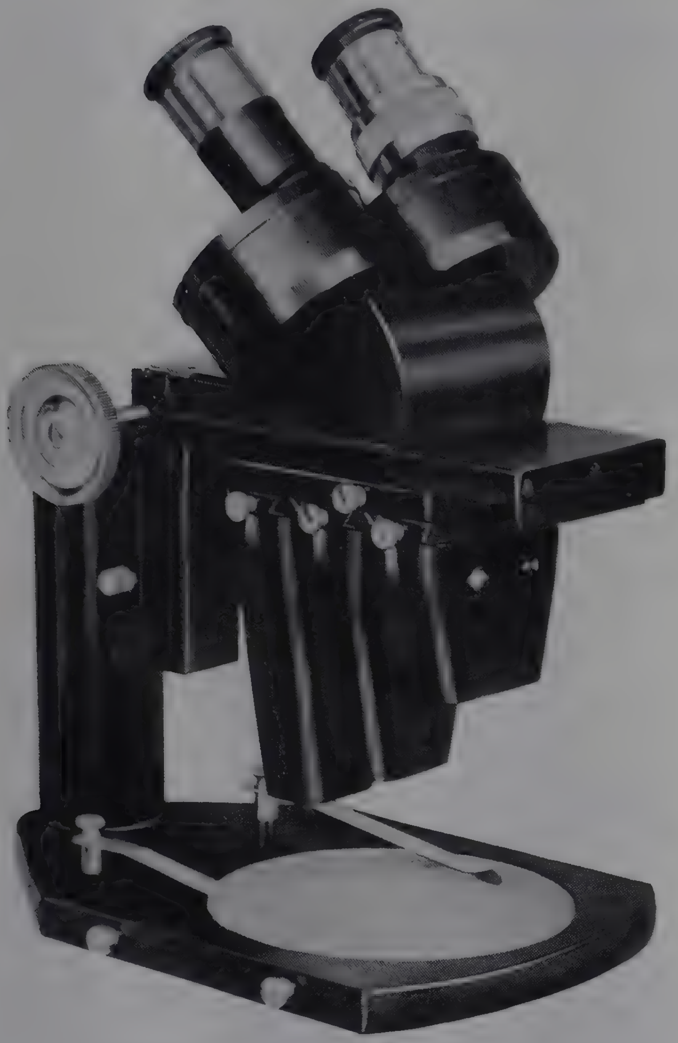
REPLACEMENT PART

MM-160	**Lamp bulb, 25W 220/240V supplies.** For price see entry in List No. sequence.

ACCESSORY

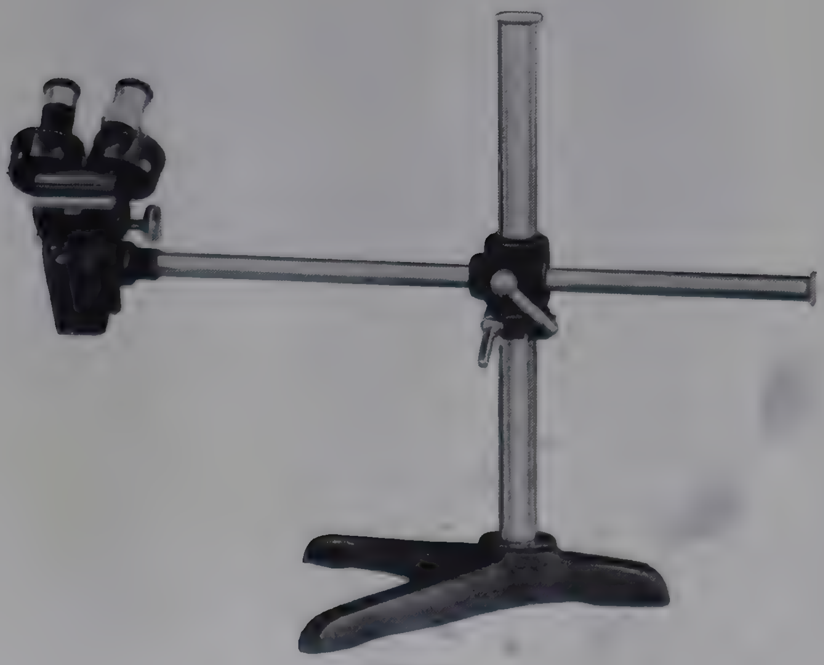
HJ-520	**Immersion oil.** For details and price see entry in List No. sequence.

PRIOR STEREOSCOPIC MICROSCOPES



MP-304

STEREOSCOPIC MAGNIFIER
See MA-900 in List No. sequence.



MP-312

A range of stereomicroscopes selected as being suitable for applications in medicine, education and industry.

- **Eyepieces inclined at 45°**
- **Adjustment for inter-pupillary distance**
- **Independent focusing compensates for differences between the observer's eyes**

BINOCULAR OPTICAL HEADS

The heads are fitted with inclined ×10 eyepieces for natural viewing from a seated position. Focusing is by rack and pinion; one eyepiece can be independently focused to compensate for ocular discrepancy and both may be adjusted for interpupillary distances between 50 and 75 mm.

OBJECTIVES

Single or triple nosepiece models are available; objectives are interchangeable being mounted in precision dovetail slides. When more than one objective is fitted in the triple nosepiece, magnification may be changed simply by sliding the assembly backwards or forwards.

Objectives	Magnification	Field of view mm	Working distance mm
×1·4	14	11·5	100
×2·0	20	9·0	82
×4·0	40	4·5	45

MP-302

MICROSCOPE, *Prior,* **Stereoscopic,** with inclined binocular head, matched pair of ×10 eyepieces, single nosepiece with matched pair of ×1·4 objectives, and foot with insert circular glass stage with two stage clips. In fitted wood case ... ... Each **£76·00** *f*

MP-304

MICROSCOPE, *Prior,* **Stereoscopic,** with inclined binocular head, matched pair of ×10 eyepieces, triple nosepiece with matched pairs of ×1·4 ×2·0 and ×4·0 objectives and foot with insert circular glass stage with two stage clips. In fitted wood case ... Each **£104·50** *f*

MP-312

MICROSCOPE, *Prior,* **Stereoscopic, long arm model** with inclined binocular head, matched pair of ×10 eyepieces, single nosepiece with matched pair of ×1·4 objectives and heavily weighted long arm stand. Each **£82·50** *f*

WATSON 5 : I ZOOM STEREOSCOPIC MICROSCOPE

- **Continuous change of magnification without change of objectives**
- **Working distance remains constant for each zoom run**
- **High image quality maintained throughout zoom run**
- **Convenient location of controls for operator comfort**

Wide angle eyepiece	Magnification range	Field of view mm	Working distance mm
×10	×10 to ×50	20 to 4	78

MP-360

ZOOM STEREOMICROSCOPE, *Watson* **Model 521** with reversible inclined eyepiece unit, matched pair of ×10 **wide angle eyepieces,** stand with focusing controls, reversible black and white stage plate and stage clips. With plastics dust cover, in fitted wooden cabinet. Each **£199·50** *f*

MP-360

MICROMANIPULATORS

For use in histology, bacteriology, physiology, crystallography, electronic microcircuitry and other applications where precise controlled movement of tools and probes is required. Vertical movement is by 'coarse' rack and pinion with vernier reading to 0·1 mm and a fine control knob marked with 20 equal subdivisions. One revolution of the 'fine' control produces a vertical movement of 0·127 mm. Horizontal movement is by rack and pinion for longitudinal travel and pinion and worm for transverse travel. Each movement has a vernier scale reading to 0·1 mm. The head drilled to accept and clamp three 6·3 mm diameter probes mutually at right angles is fitted to the end of the transverse movement. Accessories available include a micro drive which permits a 13 mm movement and a ball and socket joint which allows probes to be set at any angle required.

MP-600

MICROMANIPULATOR, *Prior,* as specification, with standard cast base and vertical, longitudinal and transverse drives ... ... Each **£38·00** *fS*

MP-602

MICROMANIPULATOR, *Prior,* as MP-600 but with tilt movement which permits the transverse movement to be inclined through 180° and clamped at any angle. Each **£41·00** *f*

MP-610

MICROMANIPULATOR, *Prior,* as MP-600 but with magnetic base controlled by a hold/release button, for machine or surface plate mounting ... Each **£45·00** *f*

MP-612

MICROMANIPULATOR, *Prior,* as MP-610 but with tilt movement which permits the transverse movement to be inclined through 180° and clamped at any angle. Each **£47·00** *f*

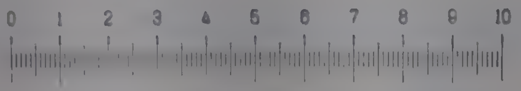
NOTE: When ordering MP-600, MP-602, MP-610 and MP-612 right hand model will be supplied unless a left hand model is specified.

MP-600

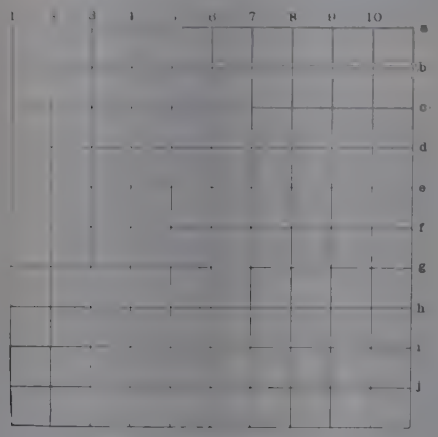
ACCESSORIES

MP-620	**Micro-drive** for 13 mm movement in a single direction, with micrometer reading to 0·01 mm. Fits standard head and accepts standard needle holders. Each	**£7·10**	*f*
MP-622	**Ball and socket joint,** permits needle holder to be set at any angle. Fits standard head ... Each	**£2·00**	*f*
MP-624	**Needle holder** with 6·3 mm dia. shaft to fit standard head and with screw chuck to grip probes from 0 to 1 mm o.d. ... ... Each	**£0·85**	*f*
MP-626	**Needle holder** as MP-624 but to grip probes from 0·75 to 1·5 mm o.d. ... ... Each	**£0·85**	*f*
MP-628	**Needle holder** as MP-624 but to grip probes from 1·25 to 3·0 mm o.d. ... ... Each	**£0·85**	*f*

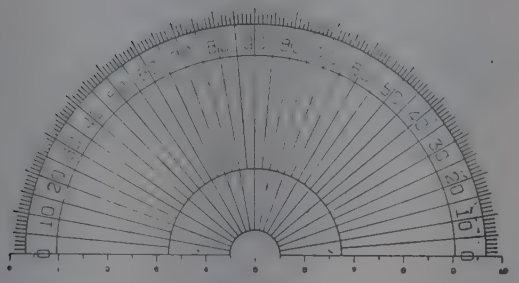
Items on this page coded *S* **normally available from stock.**



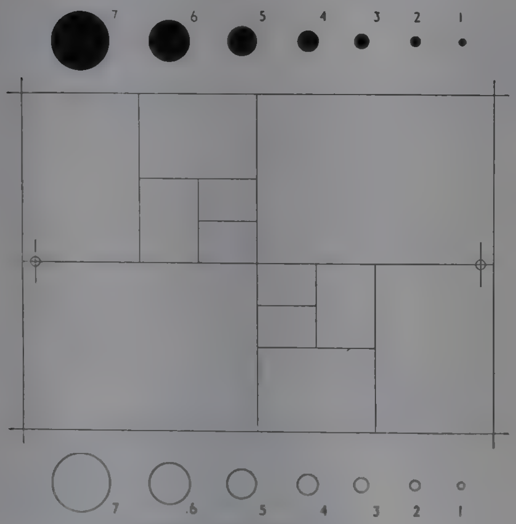
MP-710



MP-745

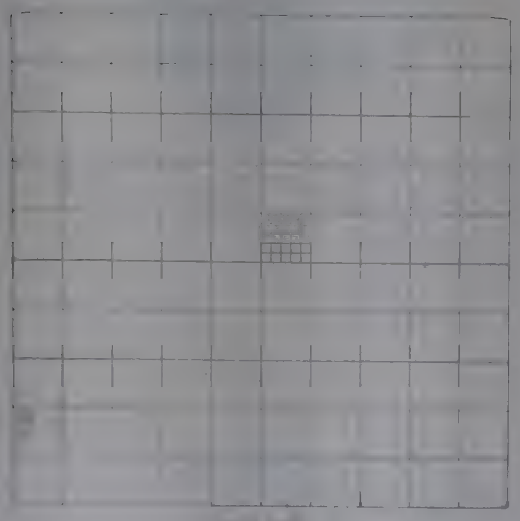


MP-760



GRID LENGTH 4·5 mm

MP-763



MP-766

EYEPIECE GRATICULES

Eyepiece graticules mounted on optical glass disks 19 mm dia. to fit *Olympus* and most other standard microscope eyepieces. The scales and rulings are in opaque black on a transparent background.

LINEAR RULINGS

List No.	Type of scale	Length	Subdivisions	Each	
				£	
MP-710	Horizontal	10 mm	100 μm	2·00	*m*
MP-712	,,	2 mm	20 μm	2·00	*m*
MP-715	Horizontal with crossline	10 mm	100 μm	2·00	*m*
MP-725	Vertical/Horizontal	10 mm	100 μm	2·00	*m*

MP-745

EYEPIECE GRATICULE. With one square, 1 cm side divided into 100 squares of 1 mm numbered and lettered along two edges... ... ... Each **£2·00** *m*

MP-760

EYEPIECE GRATICULE, half-circle protractor, graduated 0°–90°–0°, on base of 10 mm subdivided in 0·5 mm ... ... Each **£2·00** *m*

MP-763

EYEPIECE GRATICULE, to BS 3625 for determination of the particle size of powders ... ... Each **£4·00** *m*

MP-766

EYEPIECE GRATICULE, Whipple, for counting bacteria and for calibration ... ... Each **£2·00** *m*

STAGE GRATICULES

Graticules on glass disks mounted in 75×25 mm black anodised slides and supplied in plastics cases.

List No.	Length	Subdivisions	Each	
			£	
MP-770	10 mm	100 μm	**3·00**	*m*
MP-772	1 mm	10 μm	**3·00**	*m*
MP-773	100 μm	2 μm	**6·00**	*m*
MP-774	0·1 in. 2 mm	0·0005 in. 10 μm	**3·00**	*m*

MP-770

For slides, cover glasses, handling forceps and slide storage cabinets see HISTOLOGY.

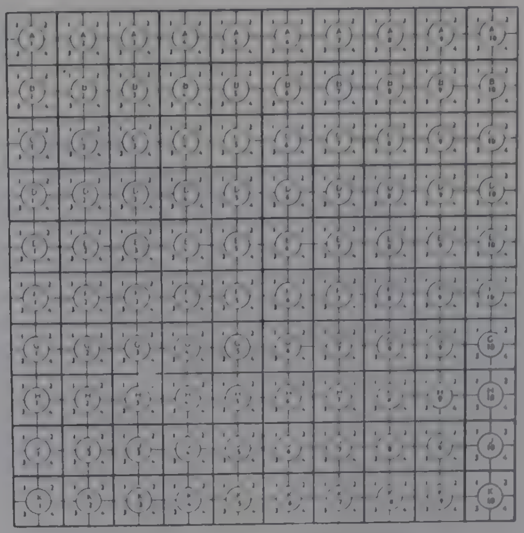
All items on this page normally available from stock.

STAGE GRATICULES

(continued)

MP-780

STAGE GRATICULE, England Finder, a 75×25 mm glass slide marked over the whole top surface in such a way that a reference position can be obtained by direct observation. The slide is marked with a square grid at 1 mm intervals. Each square contains a centre ring bearing a reference letter and number; the remainder of the square being subdivided into four segments numbered 1 to 4. All three locating edges are marked with arrow heads and the slide is marked with a positioning label. Complete with instructions ... ... Each **£4·00** *m*



Section of MP-780

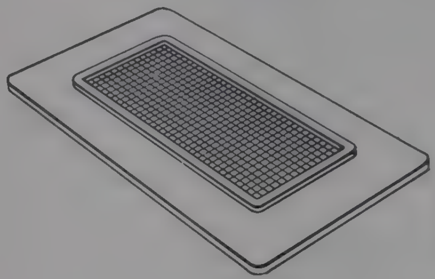
COUNTING CELLS

MP-785

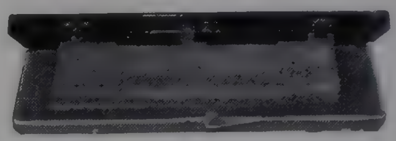
MICROLITRE COUNTING CELL, Sedgewick Rafter. A transparent plastics slide with central cell 50×20×1 mm ruled in 1 mm squares, with cover glass to contain 1 ml of liquid. For use in water analysis, particle analysis etc. Can be used with MP-766. Each **£1·50** *m*

MP-790

WORM EGG COUNTING SLIDE, McMaster, for counting parasite eggs from animals. The glass slide, 75×25 mm, has two chambers each 1 cm² counting area and 1·5 mm deep. Particularly suitable for red-worm disease in horses and parasitic gastroenteritis in cattle and sheep. In case ... ... Each **£2·25** *m*



MP-785



MP-790

MICROSCOPE LAMPS

MP-825

MICROSCOPE LAMP, *Prior*, comprising lamp house for 40W or 60W mains bulb with end cap having a 38 mm hole and holder for 51 mm square filter. The lamp is mounted adjustably on a stand 33 cm high with heavy base. The end cap and filter are removable to provide bench illumination for dissecting, etc. Complete with daylight blue filter and 60W bulb. For 220/240V supplies. Each **£3·00** *f*

MP-826

MICROSCOPE LAMP, *Prior*, as MP-825 but with lever controlled iris diaphragm. Complete with daylight blue filter and 60W bulb. For 220/240V supplies. Each **£5·00** *f*

MP-855

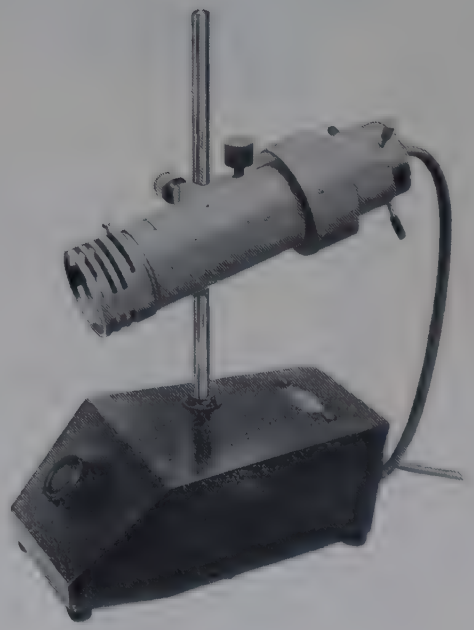
MICROSCOPE LAMP, HIGH INTENSITY, *Prior*, for transmitted, Köhler or top illumination. The 6V 48W bulb is fitted in a centring mount at the rear of the lamphouse. A lever controlled iris diaphragm is interposed between the lamp and the focusing condenser assembly the front of which has slots for three 51×51 mm filters. The lamphouse is clamped to the stand rod with an adjustable bosshead and the base houses an adjustable output transformer. For 220/240V a.c. single phase supplies. Each **£30·00** *f*

REPLACEMENT PART

MP-857 **Spare bulb,** 6V, 48W ... ... Each **£0·95** *f*

Olympus microscope lamps—see ML-800 et seq. in List No. sequence

MP-825



MP-855

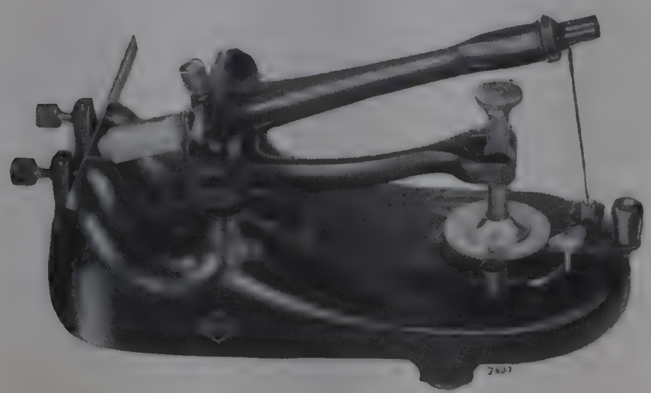
DUST COVER

MP-890

DUST COVER, PVC, for microscopes 40 cm maximum height and 30 cm maximum width ... Each **£0·40** *c*

All items on this page normally available from stock.

MICROTOMES



MR-600

STANDARD PATTERN ROCKING MICROTOME

For cutting paraffin embedded specimens of comparatively soft tissues and for use as a freezing microtome with the necessary attachment. It will cut long ribbons of sections from specimens not exceeding 20 mm dia. and using the accessory wood blocks, sections of specimens up to 20 × 25 mm may be cut. The thickness of the sections may be varied between 2 and 24 μm.

The strict application of geometric design principles and robust construction ensure unvarying accuracy in the sections obtained. Simplicity of operating makes it an ideal instrument for students' use and routine work. Complete with simple object holder, orientating object holder and knife.

MR-600

MICROTOME, ROCKING, *Cambridge*, as specification, for small sections ... ... Each **£49·00** *f*

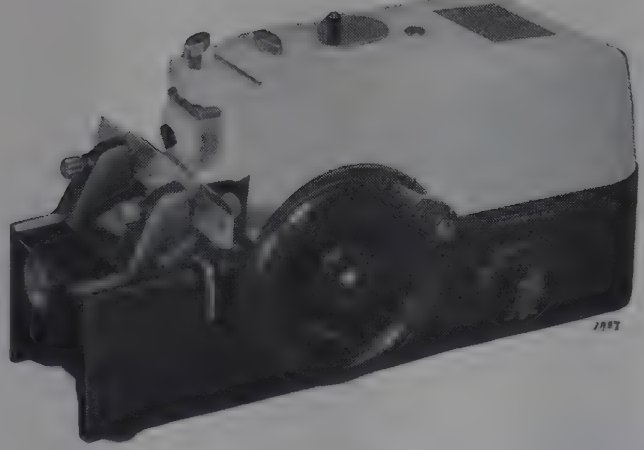
REPLACEMENT PART

MR-601	**Knife**	Each	**£3·20**	*f*

ACCESSORIES

MR-602	**Freezing attachment**	Each	**£22·50**	*fN*
MR-604	**Object holder,** for wood blocks ...	Each	**£1·00**	*f*
MR-606	**Blocks, hardwood,** with 22 × 32 mm mounting face. In packs of 12.			

Thickness	16	22 mm	
10 packs	**£3·00**	**3·00**	*f*
Pack	**£0·36**	**0·36**	



MR-660

ROTARY ROCKING MICROTOME

For cutting practically flat sections between 2 and 24 μm of specimens up to 38 × 50 mm. This microtome has a rotary drive with a smooth continuous action which cuts out automatically when the feed screw reaches the end of its travel thus avoiding damage. Specimens up to 25 mm thick may be accommodated on the wood block.

Construction

The heavily webbed base supports the knife holder and all the moving parts which are enclosed by a dustproof, light metal cover. The specimen clamp takes wood blocks up to 38 × 50 mm but either the simple or orientating holder may be secured in the clamping device of the rocker arm. A safety device locks the rocker arm at the top of its stroke to facilitate safe changing of specimen holders. The mechanical drive is arranged so that on the return stroke the specimen does not rub against the knife.

MR-660

MICROTOME, ROTARY ROCKING, *Cambridge*, as specification, with 17° knife for soft tissues and one dozen wood blocks ... ... Each **£160·00** *fN*

ACCESSORIES

MR-662	**Knife,** 22°, for hard tissues	Each	**£9·30**	*f*
MR-664	**Object holder,** for 45 mm specimen ...	Each	**£7·50**	*fN*
MR-665	**Object holder,** orientating, for 45 mm specimen.	Each	**£17·00**	*fN*
MR-666	**Adapter,** for securing MR-664 and MR-665 in specimen clamp	Each	**£1·30**	*fN*
MR-668	**Blocks, hardwood,** 16 × 38 × 50 mm. 10 packs **£3·00**	Pack of 12	**£0·36**	*f*

Aerosol freezer suitable for cooling microtome knives see RJ-550 in List No. sequence.

Gallenkamp MICROSCOPE SLIDE HOLDER

An aluminium holder to accommodate four 75 × 25 mm slides for storage in any standard filing cabinet taking 125 × 75 mm cards, see HJ-850.

Storage cabinet to take 200 of these holders in 2 drawers providing accommodation for 800 slides, see HJ-860.

These items will be found in List No. sequence under **HISTOLOGY.**

Items on this page normally available from stock except those coded *N*.

MICROTOMES

(continued)

ULTRA-MICROTOME

MR-690

ULTRA-MICROTOME, *Cambridge,* **A. F. Huxley pattern,** for cutting ultra thin sections of biological tissues and metals for examination by electron microscopy. Sections can be cut in the range of thickness 10 mμ to 150 mμ (in increments of 5 mμ) and having an area up to 3×4 mm. The instrument is specifically designed to avoid errors from thermal expansion, vibration, friction and backlash. The knife holder is designed for use with glass knives, but can also be used with other types (e.g. diamond-tipped). Supplied with standard specimen holder, 3 collets to hold specimens 4·5, 7·5 and 7·75 mm dia., specimen embedding capsules, equipment for making glass knives, 6 liquid baths, fibre glass cover and various tools and sundries... ... ... Each **£450·00** *f*

MR-690

KNIFE SHARPENER

***MR-760**

MICROTOME KNIFE SHARPENER, *Spencer,* **automatic.** The knife is stroked against the high frequency vibrating glass honing plate for three equivalent strokes, then turned over and stroked on the other side. The process is repeated for the duration of setting of the electrical timer and finally comes to a convenient rest position. Supplied with coarse and fine abrasive in oil suspension. For 220/240V 50 Hz a.c. supplies.

U.K. Each **£300·00** *f*

PRICE includes DUTY.

KNIFE SHARPENER

MR-760

EMBEDDING APPARATUS

HJ-040	**Wax Embedding Bath,** *Gallenkamp*, maximum temperature 100°C, thermostatic control to ±0·2degC.
HJ-100	**Wax Embedding Oven,** *Gallenkamp*, maximum temperature 100°C, thermostatic control to ±1degC.
HJ-180	**Wax Heater/Dispenser,** temperature range 40 to 74°C.
HJ-185	**Embedding Trays,** polystyrene with ten recesses each 20×20×13 mm deep.
HJ-200/202	**Section Mounting Baths,** alternative energy regulator or thermostatic control.
HJ-230/235	**Vacuum Embedding Baths,** single and double pan models, maximum temperature 82°C.

For full details and prices of above see entries in List No. sequence.

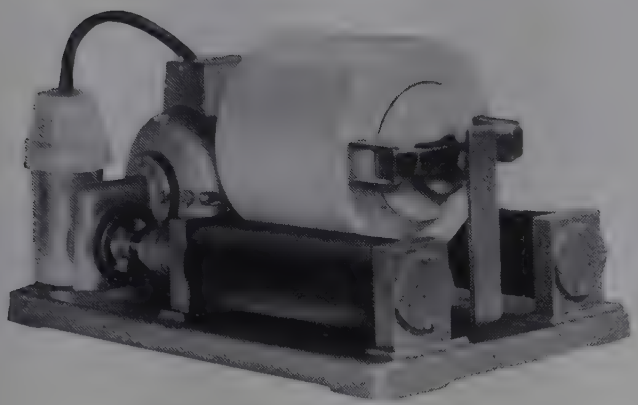
Gallenkamp

HJ-040

BALL GRINDING MILLS

MU-060

MILL, ball grinding, ***Pascall*** **Model 9,** material charge approximately 0·5 litre. The 5 cm dia. rubber covered rollers can accommodate containers up to 14 cm dia. and 18 cm long, such as a 1·0 litre porcelain pot or glass jar. The drive is from a fractional hp geared motor giving an output speed of 224 rev/min. Bench space required 38×22 cm. For 200/250V 50 Hz single phase supplies.
Without pot or ball charge ... ... Each **£60·00** *f*



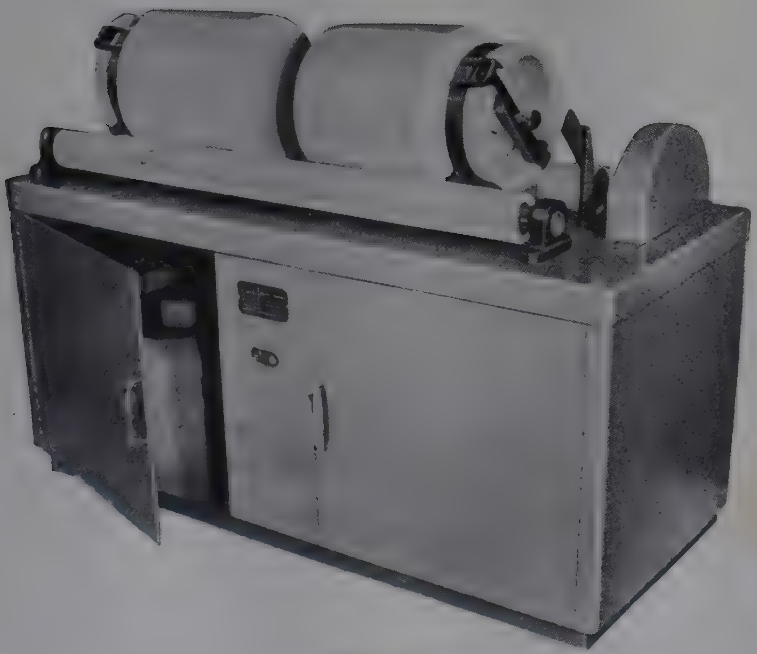
MU-060 with MU-080
(MU-065 is similar but larger)

MU-065

MILL, ball grinding, ***Pascall*** **Model 2,** material charge approximately 2 litres. The rubber covered rollers are 6·4 cm dia. × 35 cm long and can be adjusted to accommodate containers from 7·6 cm to 23 cm diameter. Suitable pot combinations are 2×1 litre, 1×2·5 litre or 1×4·5 litre pots. The drive is from a fractional hp motor giving an output speed of 182 rev/min. Bench space required 76×38 cm. For 220/240V 50 Hz single phase supplies.
Without pot or ball charges ... Each **£95·00** *f*

MU-076

MILL, ball grinding, ***Pascall*** **Model 8** mounted on a steel frame. Material charge approximately 4 litres. With two rubber covered rollers 6 cm dia. × 90 cm long which can be adjusted to accommodate containers from 12 cm to 24 cm diameter. Suitable pot combinations are 2×4·5 litre, 3×2·25 litre, 5×1 litre or 6×0·5 litre pots. The steel frame has two compartments with access doors. One compartment houses the fractional hp motor drive which gives three alternative output speeds of 132, 190 and 277 rev/min. The second compartment provides useful storage space. Floor space required 102×54 cm. For 220/240V 50 Hz single phase supplies.
Each **£215·00** *f*



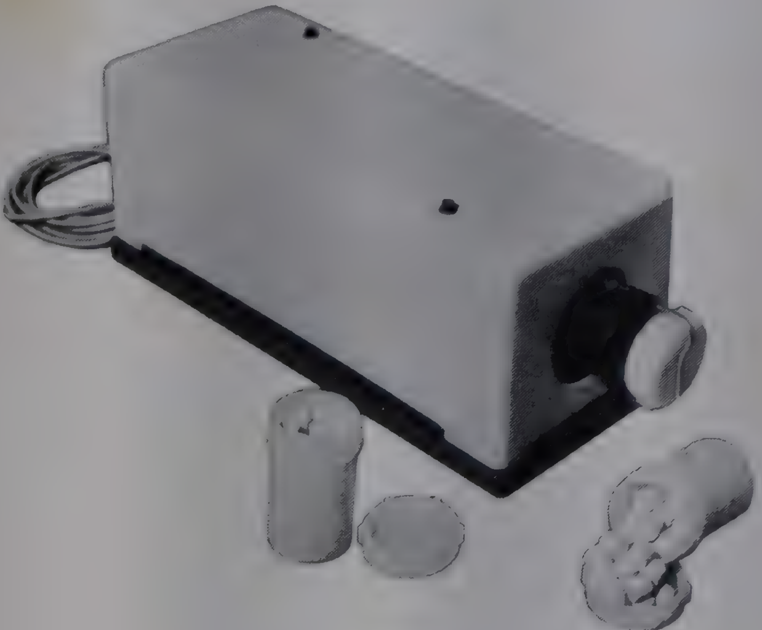
MU-076
with MU-080

ACCESSORIES FOR BALL MILLS MU-060 to MU-076

MU-080	**Ball mill pots,** hard acid resisting porcelain with ground covers and fittings. Supplied complete with rubber gaskets for use when wet grinding with certain liquids.
MU-081	**Ball charges.**
MU-082	**Strainer pourers,** heavily plated metal.

Nominal capacity litres	MU-080	MU-081	MU-082	
	Each			
0·5	£ 5·50	£ 1·00	£ 3·50	*f*
1·0	6·00	1·50	4·50	*f*
2·25	7·50	3·00	4·50	*f*
4·5	9·00	6·00	6·00	*f*

VIBRO-ENERGY MILL


MU-120

MU-120

MILL, micronising, *McCrone,* material charge up to about 10 g. A vibro-energy mill which grinds samples of minerals, giasses, fibres, pigments, etc. down uniformly to 1 μm diameter or even smaller in preparation for analysis by X-ray diffraction, X-ray fluorescence, UV emission or IR absorption techniques. Suitable for dry and slurry grinding. Comprises a 120 ml polythene grinding vessel fitted with screw cap closure which is packed with an array of non-porous corundum cylinders to produce both lineal contact blows and planar contact shear. Supplied with wood screws for fitting to a firm bench, two polythene grinding jars and an extra screw cap for pouring off slurry. For 220/240V 50 Hz supplies. Power rating 70W ... ... Each **£88·50** *fN*

NOTE: 110/115V 60 Hz model available to special order.

REPLACEMENT PARTS

MU-124	**Grinding jar,** polythene. Without grinding elements.	Each	**£1·00**	*f*
MU-125	**Grinding elements,** corundum	Set of 48	**£2·50**	*f*

ACCESSORY

MU-128	**Grinding elements,** agate ...	Set of 48	**£55·00**	*fN*

LIGHT DUTY MILLS

MU-130

MILL, light duty, hand operated, for clamping to bench or for wall mounting. Easily regulated for fine or coarse grinding. With grinding disk 9 cm dia.... Each **£2·65** *m*

***MU-160**

MILL, light duty, for grinding small quantities of material. With motor, rated for intermittent operation up to 45 sec at a time, mounted in the base and operated by a press button. The upper compartment, closed with a plastics lid, contains a high speed cutter for reducing nuts, grain, etc. to powder in a few seconds. Capacity approximately 150 ml. For 220/250V 50 Hz supplies ... Each **£4·00** *m*

MU-130

MU-160

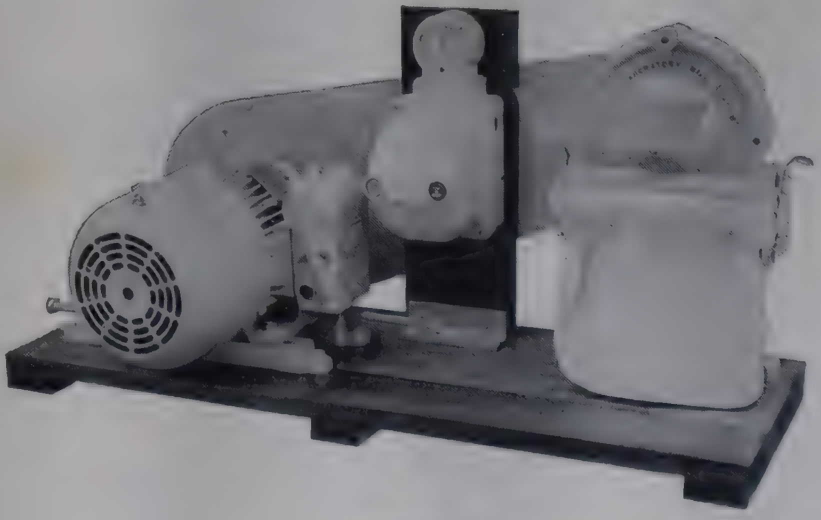
HIGH SPEED MILL

The grinding member is a four-armed high grade steel alloy beater-cross which revolves at high speed and shatters or tears sample passed into the feed aperture.

Sample is fed through an aperture 3·8×3·0 cm, and the ground material is collected in a cloth bag which is detachable from the metal frame clipping it to the underside of the mill.

MU-180

MILL, *C & N Senior,* **beater-cross,** as specification with 8 in (20 cm) diameter grinding chamber and vee belt drive giving a beater-cross speed of 8000 rev/min. Complete with capacitor start motor, starter and ammeter mounted on baseplate, feed tray, set of eight steel plate screens with perforations from 0·4 to 2·45 mm, three collecting bags and spare pair of vee drive belts. For 220/240V 50 Hz single phase supplies ... ... Each **£196·00** *mN*

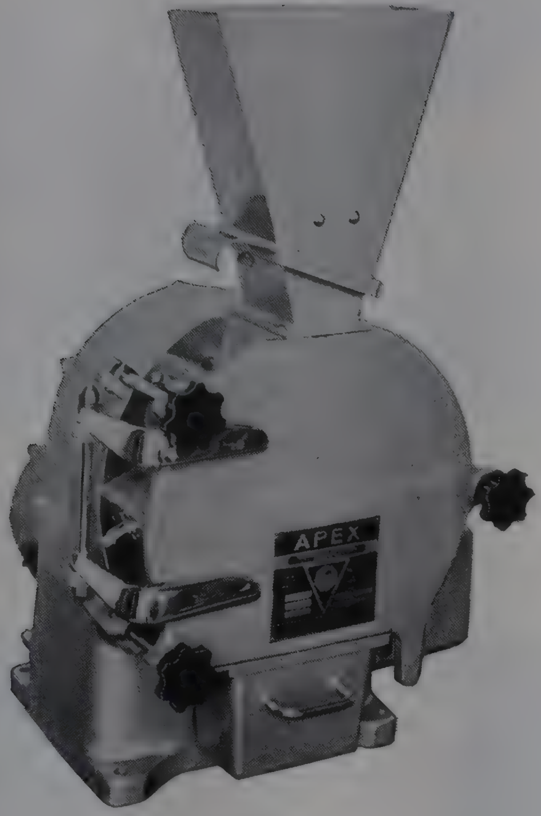

MU-180

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded ***N.***

CUTTER MILL

For milling materials of a generally fibrous nature, such as paper, foodstuffs, wood, plastics, etc., without loss of moisture from the product due to heating caused by crushing or abrasion type mills.


MU-242

MU-242

MILL, cutter, *Apex*, steel and cast iron construction, for bench mounting. The 20 cm diameter, 7·5 cm deep cutting chamber has six stationary and four rotary knives driven at about 600 rev/min. The brass screen, dovetailed into the mill frame, is easily removed after opening the hinged door. The 1 litre aluminium receiver slides in grooves in the mill frame, so that no material will fall between it and the frame or door. The feed aluminium hopper has an inclined slide gate adjustable between 7·5 cm and 4·8 cm for regulating the feed. Overall dimensions 30×50×52·5 cm high. With brass screen having 1 mm perforations, $\frac{1}{2}$ hp motor and starter. For 220/240V 50 Hz single phase supplies ... Each **£430·00** *f*

REPLACEMENT PARTS

MU-252 **Set of knives,** comprising, 4 rotary and 6 stationary knives ... ... Set **£41·50** *f*

ACCESSORIES

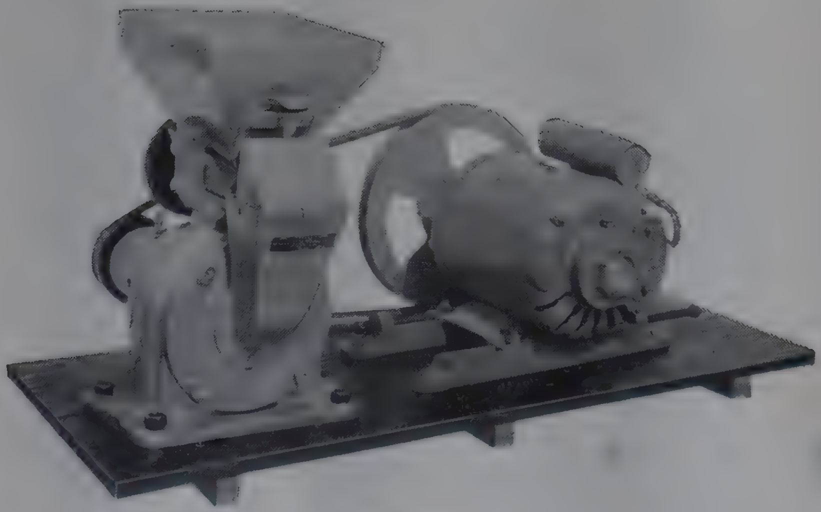
MU-254 **Screens,** brass, with 0·5, 1, 2, 3, 4, 6 or 8 mm perforations ... ... Each **£13·90** *f*

When ordering please state screen size.

MU-256 **Safety switch** to prevent mill being started with door open. The switch is built-in and can only be supplied when ordered with the mill ... ... Extra **£15·90** *f*

PULMAC MILL

For efficient and economical grinding from feed size 3 mm of a wide range of dry materials such as coal, metal ores, foodstuffs, paper, rubber, etc. down to particle sizes ranging from coarse granules to a very fine powder. The mill vibrates very little and can be mounted on bench or stand.


MU-282

OPERATION

Material is fed from the adjustable feed hopper to the central orifice of the mill. Grinding action is by rotating and stationary crowns of abrasion resisting alloy. The ground material is drawn to the periphery by centrifugal force and ejected at the bottom of the mill. When very fine grinding is required, the final reduction is controlled by a screen placed round the revolving crown. Air induced into the mill by the high speed of the rotor crown aids the effect of the centrifugal force, cools the grinding surfaces, and helps prevent blockage of the screen perforations. The material can be collected in a porous fabric bag, which releases the induced air, whilst keeping back the dust or fine particles. The rapid removal of the rotor crown from the shaft and the stator from the door facilitates cleaning.

MU-282

MILL, grinding, *Pulmac*, as specification with $\frac{3}{4}$ hp motor, starter, vee belt drive and steel screen with 0·25 mm diameter perforations. For 220/240V 50 Hz single phase supplies ... ... Each **£103·00** *m*

ACCESSORIES

MU-284 **Screens,** steel with 0·25, 0·5, 0·75, 1·0, 1·5 or 2 mm perforations ... ... Each **£1·05** *m*

When ordering please state screen size. Screens up to 10 mm perforations available to special order.

When ordering please state voltage and frequency of supply.

END RUNNER MILLS

Mechanically operated pestles and mortars of acid resistant porcelain for dry or wet grinding. A weighted pestle or runner is made to rotate by the friction between it and the rotating mortar. The pestle is free to rise and fall in the mortar, so that the grinding action is one of impact and shear. Both mortar and pestle have spring loaded scrapers, and the pestle may be swung clear of the mortar to facilitate emptying and cleaning. The mortar is fixed to a revolving table which is powered by an electric motor with push-button starter enclosed in the steel base.

MU-300

MILLS, end runner, grinding, *Pascall*, as specification, with pestle and mortar MU-305. For 220/240V a.c. supplies.

Ref. No.	0	1	
Mortar dia.	17·5	25 cm	
Each	£150·00	250·00	f

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

MU-305 **Pestles and mortars,** acid resisting porcelain.

Size	0	1	
Set	£24·00	53·00	f

MU-300 Size O

MECHANICAL MORTAR AND PESTLE

Designed to reduce 5 to 25 g of sample to a fine powder. The cast aluminium body is stove enamelled and mortars and pestles are available in either hardened steel or fused alumina. A quiet geared motor drives the pestle at 96 rev/min and the mortar at 32 rev/min in the opposite direction. The pestle head is retractable for ease of access to the mortar. A deflector is available to assist in grinding materials which have a tendency to cake. Mortar capacity approx. 90 ml.

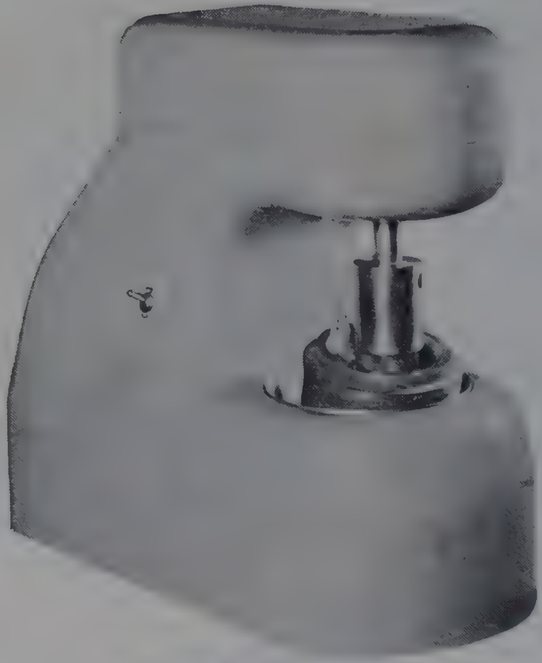
MU-400

MORTAR AND PESTLE, mechanical, as specification, for operation on 200/220 or 230/250V a.c. single phase supplies. **Without mortar, pestle or deflector.** Each **£144·87** f

When ordering please state voltage and frequency of supply.

ACCESSORIES

MU-404	**Mortar and pestle** in hardened steel...	Set	£34·75	f
MU-406	**Mortar and pestle** in fused alumina ...	Set	£46·50	f
MU-408	**Deflector** in resin-bonded fibre ...	Each	£1·50	f



MU-400 with accessories

MINCER

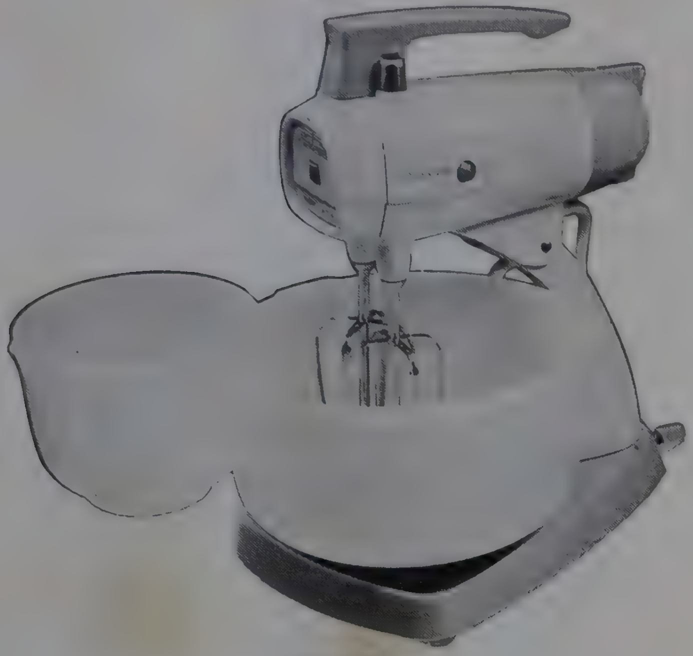
MU-660

MINCER, bench top mounting, hand operated. The body, worm feed and handle are high quality iron castings tin dipped. With two interchangeable mincer plates having 4·7 and 9·5 mm diameter holes respectively and a hardened steel rotary cutter. Incorporated in the base is a lever operated suction pad which fixes the mixer securely on any smooth surface. Average output, approx. 800 g/min. ... ... Each £3·00 *mS*

MU-660

Items on this page coded S normally available from stock.

MIXERS, EMULSIFIERS, HOMOGENISERS



MU-900

MU-900

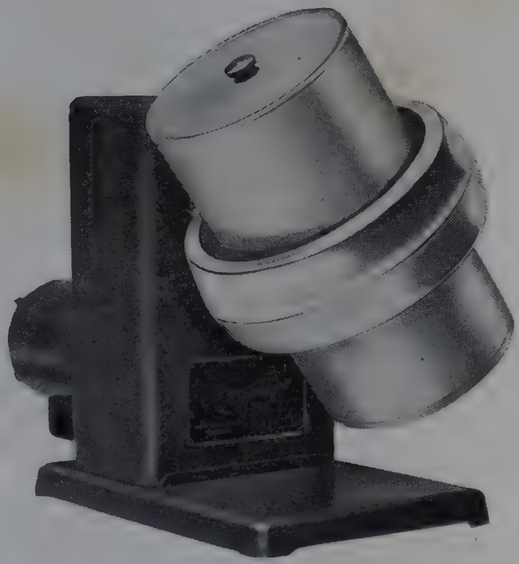
MIXER, *Sunbeam*, for mixing pastes and viscous materials. With two chromium plated intermeshing beaters each 5 cm wide held in contra-rotating chucks geared to a fractional hp totally enclosed motor. A speed control is fitted providing speeds up to 850 rev/min. Mounted on stand with swivel bracket, handle and two heat resistant glass bowls capacities 850 ml and 2800 ml. For 210/250V a.c. or d.c. supplies ... ... Each **£30·00** *m*

MU-915

MIXER, *Sunbeam*, for blending, grinding, liquefying and disintegrating. The heat resistant 1 litre glass jar contains a six bladed stainless steel cutter. A plastics stopper is inserted in the centre of the lid in order that constituents may slowly be added during the mixing process. The jar stands on the base which houses an air-cooled motor for driving the cutter at either 12,000 or 18,000 rev/min, selected by a rotary switch. For 220/250V a.c. or d.c. supplies ... ... Each **£20·35** *m*

MU-917 **Glass jar,** spare for above, complete with cutter and plastics lid ... ... Each **£4·40** *m*

MU-915



MU-920

MU-920

MIXER, powder, capacity approx. 3 litres, for mixing trace components and other additives. The detachable thick Perspex container rotates in two planes simultaneously, one around its vertical axis, and the other about its vertical centre. This movement produces a complete and perfect mix very quickly. The container has two stationary spreaders across the centre for breaking up coagulating material and is held in position by a simple locking device. For 220/240V a.c. supplies. With container ... ... Each **£95·15** *mN*

MU-922 **Container,** Perspex, spare for above mixer. Each **£11·35** *mN*

MU-942

EMULSIFIER, hand-operated, for emulsification of materials except those containing coarse solid matter or having very high viscosity. When the lever is operated at 80/90 strokes per minute, 500 ml of material are processed in 4 minutes. Comprises aluminium bowl and stand, copper alloy cylinder with leak-proof, close fitting piston, and all other contact parts of stainless steel. With bench clamp, two different size jets and jet cleaning tool. Each **£17·00** *f*

MU-942

Gallenkamp REGD TRADE MARK

SHAKERS AND STIRRERS

Bottle shaker	see SD-050
Flask shaker	see SD-110
Handilab stirrer	see SS-425
Variable speed stirrers	see SS-530 and SS-540
Magnetic stirrers	see SS-590 to SS-620

For details and prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

MU-950

HOMOGENIZER, *Minisonic* 4, for rapid emulsification of liquid mixtures on laboratory and pilot plant scale. An electrically driven pump forces the liquid to be processed into a whistle at a particular velocity. The crossover jet of the whistle creates a flat stream of liquid which causes the vibration of a blade at about 22 kHz. The speed of the blade vibration and the inherent inertia of the liquid induces very high cavitation forces which efficiently emulsify almost any mixture which can be pumped at sufficient speed. Output is about 3 litres/min depending upon viscosity of the sample. Two 3 litre glass vessels enable two phases of a mixture to be processed without premixing or several passes to be made. All metal parts in contact with the liquid are of stainless steel and the instrument is easily cleaned. With ½ hp electric motor, pump, control valve and vibrating element. For 230V 50 Hz single phase supplies ... Each **£238·50** *f*

When ordering please state voltage and frequency of supply.

MU-950

REPLACEMENT PARTS

MU-954 Kit of spares, comprising:
12 vibrating element blades
8 U-rings for glass vessels
4 each 4 sizes sealing rings
2 glass vessels
1 set of tools ... ... Set **£20·50** *f*

MIXER EMULSIFIERS

OPERATION

Materials are subjected to intense mixing and shearing actions and expelled with high velocity into the mix. By correct choice and positioning of the head, smooth mixing free from turbulence and aeration can be achieved.

CONSTRUCTION

All working parts are of stainless steel except the self-lubricating bushes which are normally of phosphor bronze. Heads are quickly interchanged without the use of special tools. A submersible pump head is included with each outfit.

HEADS

Emulsor head, expels material horizontal to the rotor shaft and so creates a circular mixing motion. This head is not used with the laboratory model MU-962.

Axial flow head, expels material upwards parallel to the rotor shaft. It is recommended for use where mixing free from aeration is required, and is specially suitable for preventing heavy liquids and insoluble solids settling during the mixing process.

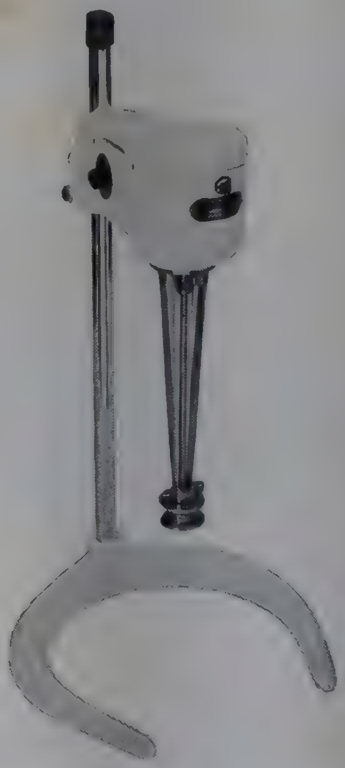
Disintegrator head, used for rapid disintegration and suspension of fibrous materials. It can be used with the emulsor and axial flow heads.

Screen head, used to assist processing and breaking down agglomerates. It can be used with the emulsor and axial flow heads.

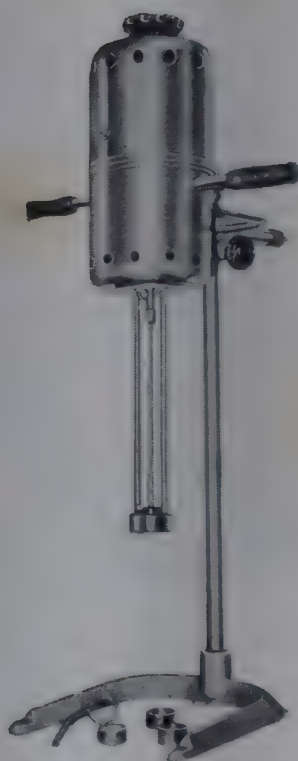
Pump head, a submersible self priming centrifugal pump with an output of up to 18 l/min.

MU-962

MIXER EMULSIFIER, *Silverson,* **laboratory model,** as specification, with variable speed drive. Suitable for a maximum immersion depth of 24 cm and a minimum opening of 6 cm. Complete with axial flow, disintegrator, screen and pump heads and bench stand. For 200/240V 50 Hz single phase supplies ... ... Each **£72·55** *mS*



MU-962



MU-965

MU-965

MIXER EMULSIFIER, *Silverson,* **heavy duty model,** for processing viscous materials. As specification with variable speed drive. Suitable for a maximum immersion depth of 30 cm and a minimum opening of 6 cm. Complete with emulsor, axial flow, disintegrator, screen and pump heads and bench stand. For 200/240V 50 Hz single phase supplies ... ... Each **£80·63** *m*

When ordering please state voltage and frequency of supply.

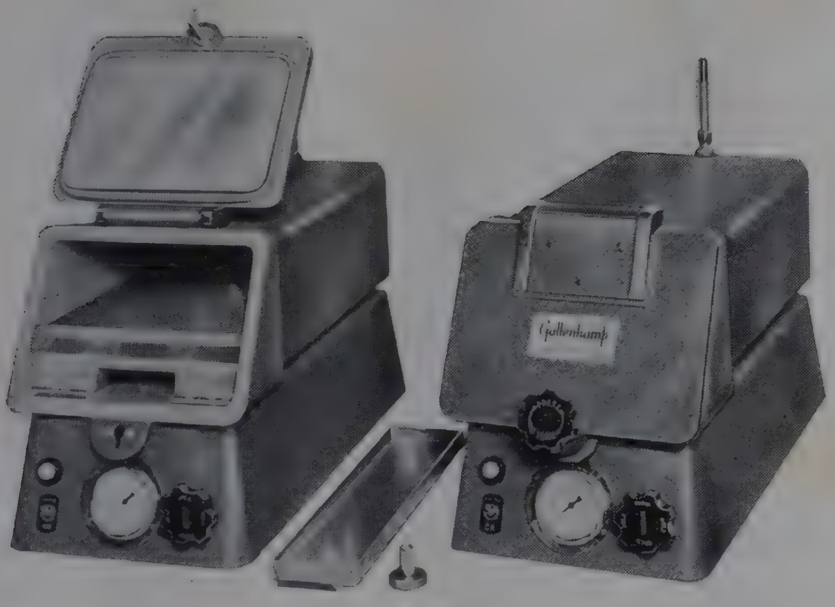
Outfits for micro disintegration, processing of highly abrasive materials and for working under aseptic conditions are available to special order. Further information available on receipt of full details of requirements.

Items on this page coded *S* normally available from stock.

Gallenkamp VACUUM DRYING OVEN

FOR MOISTURE DETERMINATION OR DRYING UNDER VACUUM AT TEMPERATURES UP TO 140°C

- **Robust cast light alloy vacuum chamber**
- **Easy-open door with tubular rubber seal**
- **Built-in thermostat and vacuum gauge**
- **3-way vacuum tap for—evacuation**
  - **—isolation**
  - **—refilling the chamber**



MV-600

DESIGN

A thermostatically controlled hotplate is mounted on the base of the vacuum chamber. Samples are normally contained in flat metal dishes which make good thermal contact with the hotplate and therefore rapidly reach temperature equilibrium with it. For measurement of hotplate temperature, a pocket is fitted, through which a thermometer may be inserted, the seal being effected with rubber tubing.

The bimetallic thermostat controls the heater load through a power relay.

PERFORMANCE AND DIMENSIONS

Temperature range	50 to 140°C
Temperature fluctuation	1degC
Temperature variation	±1degC
Power rating max.	200W
Dimensions	H W D
Internal	7 × 20 × 33 cm
External	30 × 25 × 58 cm
Weight, net	20 kg

MV-600

VACUUM OVEN, *Gallenkamp*, as specification with cast light alloy vacuum chamber, easy-open door, bimetallic thermostat, power relay, 3-way vacuum tap, vacuum gauge and one each thermometers MV-616 and MV-618. For a.c. single phase or d.c. supplies.

For 220/240V	Each	**£185·00**	*b*
For 200/210V	Each	**£186·00**	*bN*
For 110/120V	Each	**£186·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

MV-612 Heating element, 200W ... ... Set £6·50 *b*

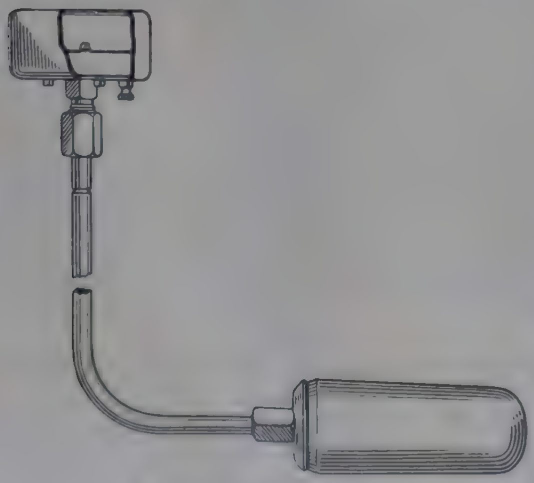
When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

MV-614 Door gasket, rubber ... ... Each £0·30 *b*

MV-616 Thermometer, oven, solid stem, range 50 to 110°C subdivided in 1·0degC, with graduations commencing about 120 mm from base of mercury bulb. Overall length about 180 mm, stem diameter 5 to 6 mm.
Ten £8·60 Each £0·96 c

MV-618 Thermometer, oven, as MV-616 but range 95 to 145°C.
Ten £13·20 Each £1·50 c

Gallenkamp SOIL MOISTURE TENSIOMETERS



Bench Model SH-085

For the determination of the force which a root must overcome in order to draw water from soil.

Widely used by commercial growers, horticultural and agricultural research stations.

- **Continuous reading of soil moisture tension**
- **Suitable for soil depths between 7·5 cm and 60 cm**

SH-080 Growers model.

SH-085 Bench model.

SH-090 Orchard model.

For details and prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp MOISTURE EXTRACTION OVEN, 250°C

A large capacity modern oven designed for the rapid, even drying of wet bulk laboratory and industrial samples such as sand, vegetable matter, tobacco, wood pulp, paper, etc.

Gallenkamp
OVEN

OV-440

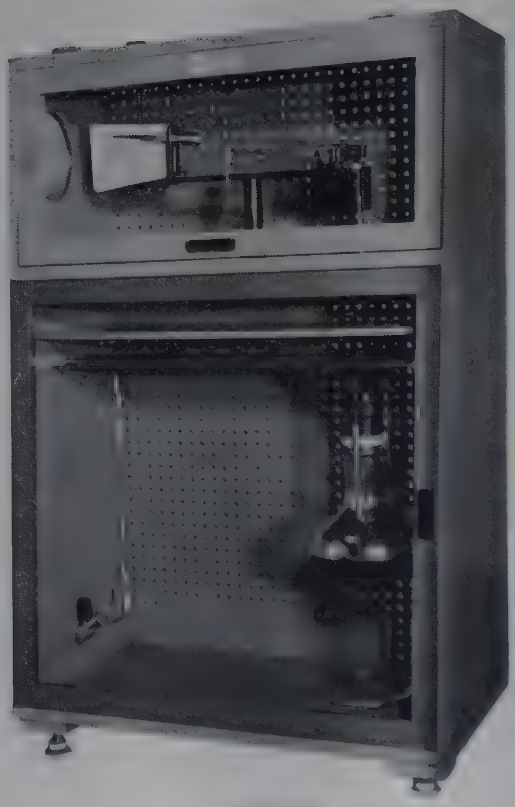
- **Accurate temperature control by direct reading *Compenstat* (solid state)**
- **Safety thermostat for additional protection**
- **Capacity 210 litres (7·5 ft^3)**
- **Forced ventilation and large heater for rapid moisture extraction**
- **Liner of corrosion resistant stainless steel to BS 971, EN 58B**

For full details and prices see OV-440 and OV-445 in List No. sequence.

INFRARED MOISTURE TESTER

MV-660

MOISTURE TESTER, infrared balance type, for moisture determination in granular and powdered substances. The upper section of the three compartment cabinet contains a balance beam with rider bar scaled 0–100% moisture in 5% divisions and a pointer on the end of the beam which moves over a scale of 5% divided in 0·1%. The other end of the beam carries a suspension system which passes down through the middle heat insulating compartment to support a detachable concave pan below the heater. For 240/250V a.c. supplies.
Each **£63·00** *f*



MV-660

INFRARED DRYER, *Mettler*, for use with precision top loading balances.

For details and price see BA-948 in List No. sequence.

Other equipment used in the determination of water content.

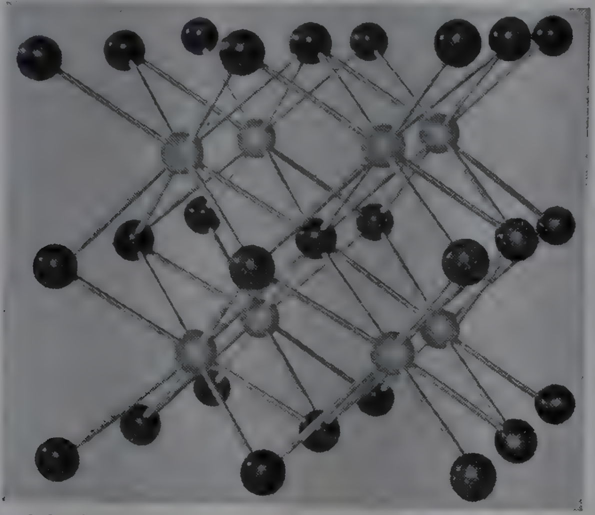
EJ-960 et seq.	Karl Fischer apparatus.
OV-010 et seq.	Drying ovens.
WJ-130 et seq.	Dean and Stark apparatus.

For full details see entries in List No. sequence.

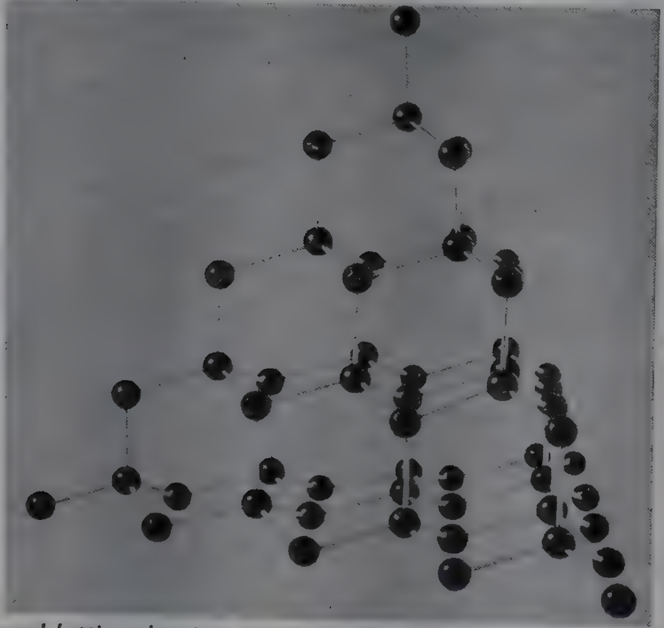
Gallenkamp MOLECULAR MODELS

Originally suggested by Professor W. H. Linnell, D.Sc., Ph.D., F.P.S., F.R.I.C. and repeatedly improved, these models provide a simple means of demonstrating many aspects of molecular and crystal structure.

They are suitable for making models of the molecular, ionic and lattice structures specified in Nuffield Chemistry courses and in many G.C.E. and C.S.E. Chemistry and Physical Sciences syllabuses.



A body-centred cubic lattice for illustrating the arrangement of the crystal axes



Diamond lattice showing tetrahedral arrangement of carbon atoms

MV-800

FOR ORGANIC CHEMISTRY

- to exhibit stereochemical properties
- choice of inter-nuclear distance scales
- valence angles provided by accurate drilling
- for construction of highly strained molecule models.

FOR INORGANIC CHEMISTRY

- for construction of practically any simple inorganic model
- to demonstrate details of configuration
- especially useful for metal co-ordination chemistry
- wide range of symmetries available.

FOR CRYSTALLOGRAPHY

- vivid spatial representation of atoms in lattices
- invaluable for discussion of crystal properties.

The model atoms are moulded polythene spheres drilled to accept the spring bonds. Hole configurations are as follows:

1-hole

2-holes—holes subtend an angle 109° at the centre of the sphere.

4-holes—directed from the centre towards the apices of a regular tetrahedron.

5-holes—directed from the centre towards the apices of a regular trigonal bipyramid.

6-holes—directed from the centre towards the apices of a regular octahedron.

8-holes—directed from the centre towards the corners of a cube.

14-holes—positioned in a unique pattern which enables all common chemical symmetries to be represented.

The connecting springs are close-wound helices of rust resistant steel and are available in four lengths—25 mm, 38 mm, 60 mm and 75 mm. These lengths provide for inter-nuclear distances scaled 0·1 nm = 35 or 48 or 60 mm. Each spring is tapered to fit securely at a controlled depth in all drillings. The assembled models are sufficiently rigid to withstand handling and due to the use of springs for bonding, atomic vibrations can be demonstrated.

CHEMISTRY AND CRYSTALLOGRAPHY SETS

Introductory sets MV-800 and MV-805 include quantities of spheres and springs for trial purposes or individual student use.

The chemistry set enables simple molecules and ions to be made and stereochemical and structural distinctions to be clearly illustrated.

The crystallography set permits the construction of several different lattice types from universally drilled spheres.

DEMONSTRATION SET

The demonstration set MV-815 is suitable for making numerous models of which the following are examples:

Crystal lattices

Sodium chloride, caesium chloride, calcium fluoride, rutile, zinc blende, diamond, graphite and ice.

Molecules and ions

Phosphorus, sulphur, phosphorus pentoxide, phosphorus pentachloride, phosphate, carbonate, sulphate, nitrate, ammonium and many complex ions.

MV-800

MOLECULAR MODELS, *Gallenkamp*, **chemistry set,** as specification, including instructions leaflet. Comprises the following components packed in a plastics box.

40 white balls	(MV-850)	6 black balls	(MV-874)
6 green balls	(MV-854)	2 brown balls	(MV-874)
6 red balls	(MV-856)	6 yellow balls	(MV-874)
20 black balls	(MV-860)	40 springs 25 mm	(MV-840)
6 blue balls	(MV-860)	40 springs 38 mm	(MV-840)
6 yellow balls	(MV-860)		

10 sets £39·00 Set £4·40 I *b*

Gallenkamp MOLECULAR MODELS

MV-805

MOLECULAR MODELS, *Gallenkamp,* **crystallographic set,** as specification, including instructions leaflet. Comprises the following components in a plastics box.

36 brown balls (MV-874)
36 orange balls (MV-874)
36 purple balls (MV-874)
150 springs 38 mm (MV-840)
150 springs 60 mm (MV-840)

10 sets **£88·00** Set **£9·80** *b*

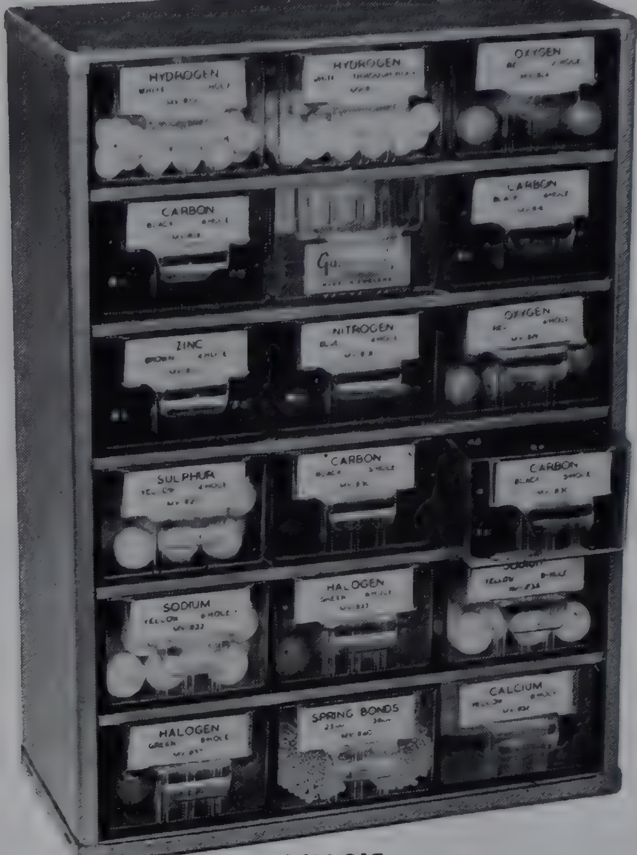
MV-815

MOLECULAR MODELS, *Gallenkamp,* **demonstration set,** as specification, stored in multi-drawer cabinet with printed labels, and illustrated instructions leaflet. Comprises:

60 white balls (MV-850)
24 white balls (MV-852)
24 red balls (MV-856)
60 black balls (MV-860)
24 brown balls (MV-860)
24 blue balls (MV-860)
24 green balls (MV-860)
24 red balls (MV-860)
24 yellow balls (MV-860)
60 black balls (MV-862)
12 blue balls (MV-862)
12 red balls (MV-862)
12 green balls (MV-862)
48 yellow balls (MV-866)
48 green balls (MV-866)
24 yellow balls (MV-868)
48 green balls (MV-868)
420 springs 60 mm (MV-840)
84 springs 38 mm (MV-840)
12 springs 25 mm (MV-840)

1 organic chemistry stencil SP-960 with instructions booklet.

Set **£34·00** *b*



MV-815

REPLACEMENT COMPONENTS

BONDS

MV-840 **Spring bonds.** Close wound spiral springs. In packs of 12.

Overall length	25	38	60	75 mm	
10 packs	**£0·74**	**0·84**	**1·20**	**1·50**	*b*
Pack	**£0·15**	**0·16**	**0·19**	**0·22**	

ATOMS

MV-850 **Model atom, white,** 16 mm dia., **one hole.** In pack of 12.
10 packs **£2·20** Pack **£0·28** *b*

MV-852 **Model atom,** as MV-850 but with hole right through of clearance diameter of the spring. Represents hydrogen in hydrogen bonding. In pack of 12.
10 packs **£3·30** Pack **£0·39** *b*

MV-854 **Model atom, green,** 22 mm dia., **one hole.** In pack of 12.
10 packs **£2·80** Pack **£0·34** *b*

MV-856 **Model atom, red,** 22 mm dia., **two holes.** In pack of 12.
10 packs **£3·60** Pack **£0·42** *b*

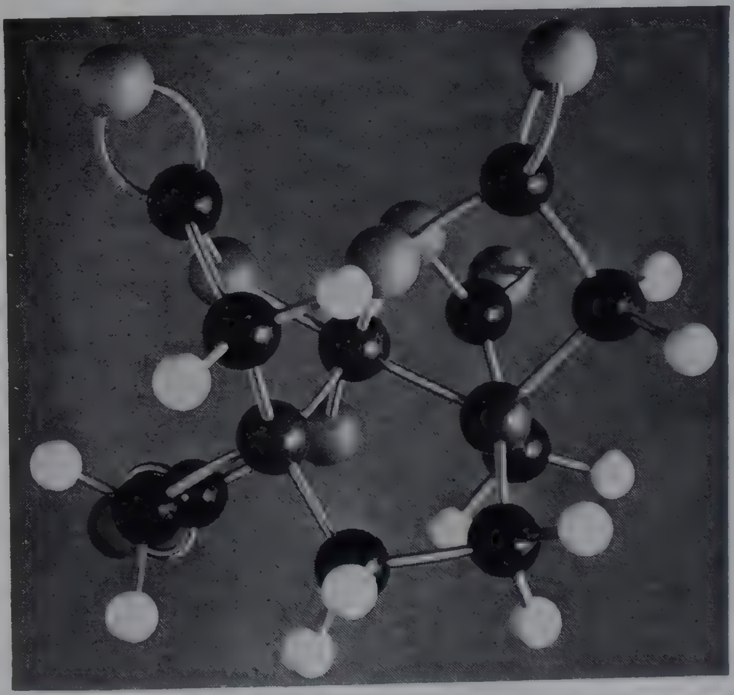
MV-860 **Model atoms,** 22 mm dia., **four hole.** Available coloured **black, blue, brown, green, red or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£3·90** Pack **£0·45** *b*

MV-862 **Model atoms,** 22 mm dia., **five hole.** Available coloured **black, blue, green or red.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£3·90** Pack **£0·45** *b*

MV-866 **Model atoms,** 22 mm dia., **six hole.** Available coloured **green or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£5·70** Pack **£0·64** *b*

MV-868 **Model atoms,** 22 mm dia., **eight hole.** Available coloured **green or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£4·50** Pack **£0·50** *b*

MV-874 **Model atoms,** 22 mm dia., **fourteen hole.** Available coloured **black, brown, orange, purple or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£5·70** Pack **£0·64** *b*



Model of the calcium complex of e.d.t.a. showing the octagonal structure of the calcium atom and its occurrence in five 5-membered rings

Stencil for drawing representations of models made with these sets see SP-960 in List No. sequence.

SUGGESTED COLOUR CODE

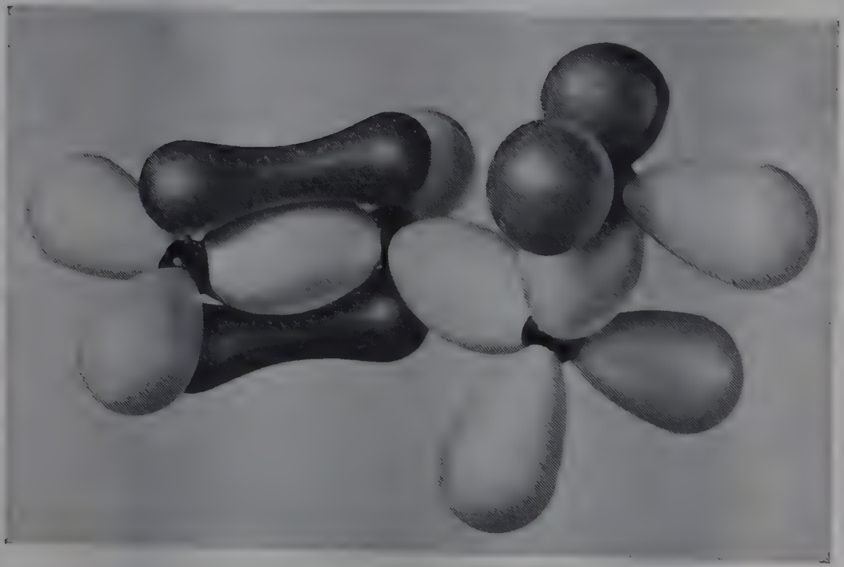
Black — Carbon
Blue — Nitrogen
Brown — Metals
Green — Halogen
Orange — Universal
Purple — Universal
Red — Oxygen
White — Hydrogen
Yellow — Sulphur or sodium, calcium or caesium in some lattices

NOTE: Universal atoms are used to represent nuclei in crystal structures, co-ordination compounds, complex ions etc.

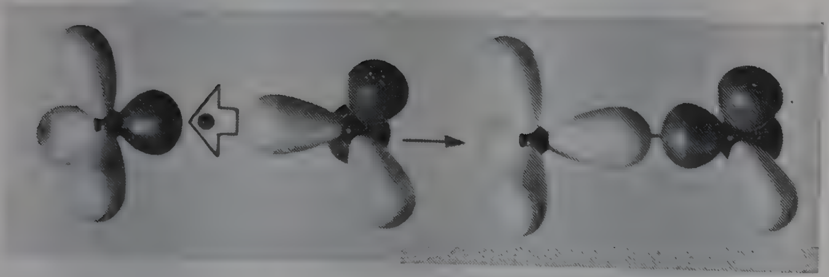
All items on this page normally available from stock.

Gallenkamp PEEL MODELS

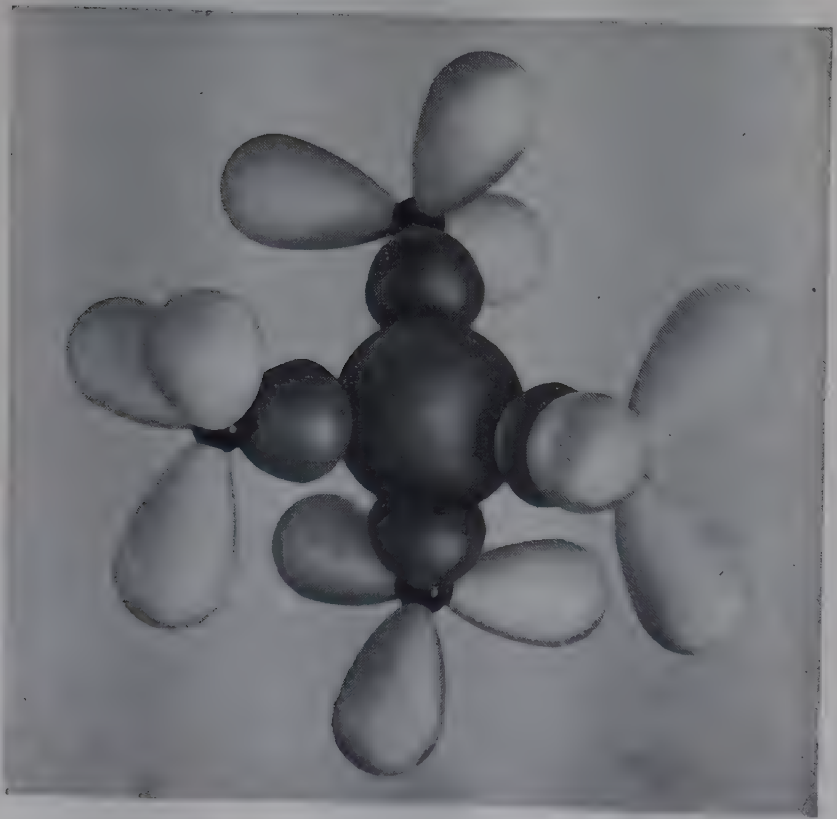
PROBABILITY ENVELOPES OF ELECTRON LOCATION



Propenol (1:2 Propene, 3-ol)



$NH_3 + H_2O \longrightarrow NH_4^+ + OH^-$
Reaction emphasising the shapes of molecules and proton transfer



The tetrammine zinc II ion

Designed in collaboration with M. B. Ormerod, B.Sc., Dip.Adv.Stud.Ed.(Manc.), F.R.I.C., Brunel University, who has successfully used them in teaching school and college chemistry over a number of years.

The Instructions Manuals supplied with sets describe the use of Peel models and cover constructional details and teaching applications. A fuller explanation appears in 'The Architecture and Properties of Matter; An Approach through Models' by M. B. Ormerod, published by Edward Arnold (Publishers) Ltd., London.

The models are suitable for CSE, GCE 'O' and 'A' levels and higher education courses.

DESCRIPTION

The *Gallenkamp* PEEL Models are expanded polystyrene shapes, in characteristic colours, which represent the 'Probability Envelopes of Electron Location' viz., the molecular orbitals in which there is a statistically high certainty of finding the bonding or non-bonding electrons. The models represent:

Single bond sigma orbitals (white)
Protonated orbitals (white)
Lone pair or non-bonding orbitals (red) and
Pi-orbitals in two and three lobed and hexagonal (aromatic) shapes.

PEEL models are compatible with (i.e. they have a common scale) and complementary to *Gallenkamp* Molecular Models in that they are drilled for attachment, by means of close coiled springs, to the *Gallenkamp* atom models MV-850 et seq. Provision is made for representing many bond angles in a wide range of symmetries.

APPLICATIONS

The mathematical basis of the Molecular Orbital Theory is complex but the application of its results is invaluable in illustrating many phenomena which are otherwise difficult to explain. Indeed whereas a rigorous approach to the theory is possible only in degree courses, even CSE and 'O'-level students can understand structures and the nature of many reaction mechanisms with the help of PEEL Molecular Orbital Models. If the models are presented as results of the molecular orbital approach, much of the chemistry of the species they represent, and their shapes, can be explained by two concepts:

1. coulombic forces of attraction and repulsion between separate nuclei and electrons in separate orbitals.
2. qualitative variations in **effective nuclear charge** and hence differences in coulombic forces resulting from the variations in the shielding effects of electrons in different orbitals.

PEEL models draw the attention of the student to the location of all the outer electrons in molecules whether they are involved in bonding or not. This is vital for understanding shape, basic character and capacity for hydrogen bonding.

With the **Introductory Set** models of methane, ammonia, water, carbon dioxide and ethylene can be made, to demonstrate features of structure and reactivity.

The **Benzene Ring Set** provides for the construction of one complete benzene molecule model.

The **General Purpose Set** enables over one hundred compounds of C, N, O and F to be built, including benzene, heterocyclic compounds and their substituted derivatives, neutral and charged hydrides, alkanes, alkenes, aliphatic halides, alcohols, ethers, aldehydes, ketones, oximes, carboxylic acids, esters, amides and amines up to C_4. Cells of the diamond, graphite and ice lattices can also be built.

Delocalisation is illustrated by vinyl fluoride, nitroparaffins, ozone, nitrate ion, carboxylic acids and their derivatives and aromatic species.

Structures involving elements in higher periods can be explained by analogy to the elements of the second period.

Gallenkamp PEEL MODELS

FOR MOLECULAR ORBITAL EXPLANATIONS OF

- Shapes of molecules
- Bond lengths
- Proton migration in:
  - Interaction of hydrides
  - Electrolysis and ionic migration
  - Precipitation and solution of metal hydroxides
  - Hydrolysis
  - Enolisation
  - Catalytic functions of water
- Relative strengths of acids and bases
- Solvation of ions
- Hydrogen bonding and its relation to:
  - Solubility, volatility, viscosity, anomalous properties of ice and water, clathrates
  - Dimerisation of carboxylic acids
  - Coiling of peptide chains
  - Strength of polyamide fibres
  - Structures of hydrates
- Nature of diamond, graphite and ice lattices
- Complex ion formation
- Pi-bonding, delocalisation and aromatic character
- Organic reaction mechanisms
- Van der Waals forces

In addition to an Instructions Manual, sets are supplied with a stencil to help the student to draw models rapidly and accurately, also with printed cards scaled in molecular dimensions. The models are made to the scale 0·1 nm = 60 mm.

The addition of packs of components, springs and central atoms to the standard sets extends the scope of PEEL models almost indefinitely.

MV-905

PEEL MODELS, *Gallenkamp,* **Introductory Set** as specification, comprising the following components packed in a strong storage carton:

3 sigma orbitals, 0·135 nm	(MV-928)	Spring bonds	(MV-840)
		12×25 mm	12×38 mm
12 protonated orbitals	(MV-932)	Model atoms	
		4 black 2 blue	(MV-860)
12 lone pair orbitals	(MV-934)	2 green 2 red	(MV-860)
		2 black	(MV-862)
2 pi-orbitals	(MV-940)	1 scale card	(MV-952)
With instructions manual		1 stencil	(MV-950)

10 sets **£21·00** Set **£2·35** *b*

MV-910

PEEL MODELS, *Gallenkamp,* **Benzene Ring Set.** Comprising the following components packed in a strong storage carton:

6 sigma orbitals, 0·135 nm	(MV-928)	5 scale cards	(MV-952)
6 protonated orbitals	(MV-932)	6 model atoms, black	(MV-862)
		12 springs, 25 mm	(MV-840)
2 benzene pi-orbitals	(MV-936)	24 springs, 38 mm	(MV-840)
1 stencil	(MV-950)	1 instructions manual	(MV-954)

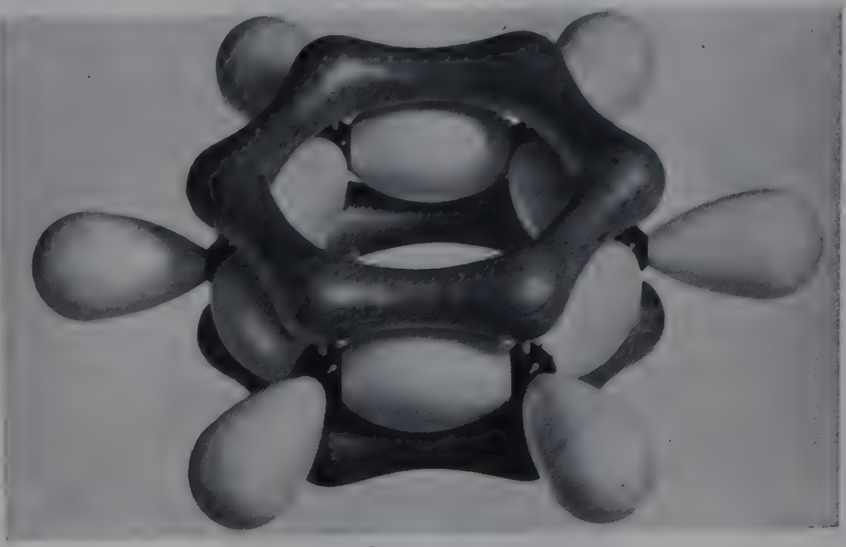
10 sets **£25·00** Set **£2·80** *b*

MV-915

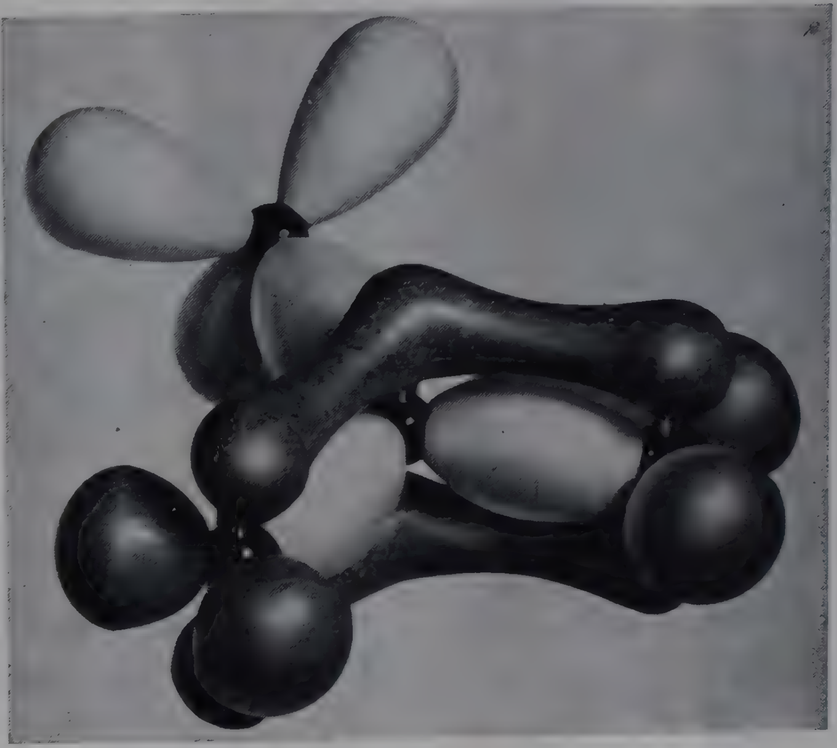
PEEL MODELS, *Gallenkamp,* **General Purpose Set** as specification, comprising the following components packed in a strong storage carton:

9 sigma orbitals, 0·135 nm	(MV-988)	1 stencil	(MV-950)
		5 scale cards	(MV-952)
3 sigma orbitals, 0·15 nm	(MV-930)	Spring bonds	(MV-840)
		24×25 mm	36×36 mm
18 protonated orbitals	(MV-932)	Model atoms	
		6 black 2 blue	(MV-860)
12 lone pair orbitals	(MV-934)	4 green 2 red	(MV-860)
		12 black 2 blue	(MV-862)
2 pi-orbitals	(MV-936)	4 red 2 green	(MV-862)
2 pi-orbitals	(MV-942)	1 instructions manual	(MV-954)
2 pi-orbitals	(MV-942)		

10 sets **£48·00** Set **£5·40** *b*



Benzene



The acetate ion

Bibliography

MV-925

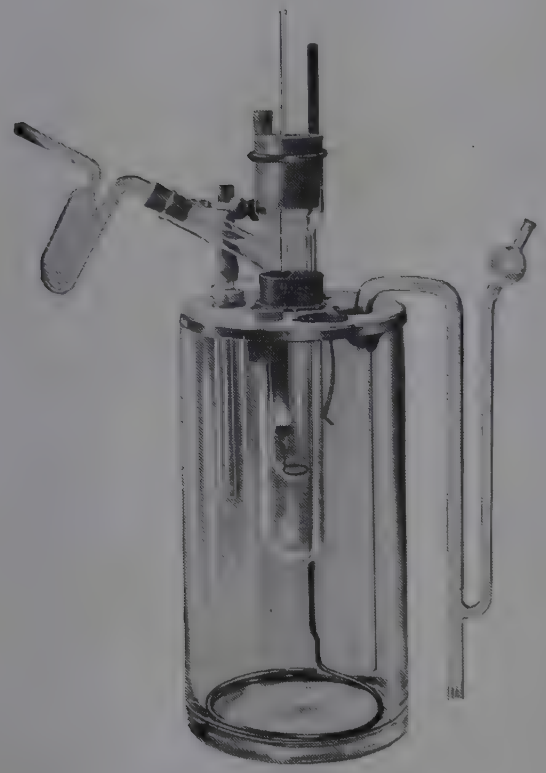
TEXT BOOK, 'The Architecture and Properties of Matter; An Approach through Models' by M. B. Ormerod, published by Edward Arnold (Publishers) Ltd., London.
Each **£4·00** *m*

REPLACEMENT COMPONENTS

MV-928	**Sigma orbital model,** 0·135 nm, white, in pack of 6.	10 packs	**£3·10**	Pack	**£0·37**	*b*
MV-930	**Sigma orbital model,** 0·15 nm, white, in pack of 6.	10 packs	**£3·10**	Pack	**£0·37**	*b*
MV-932	**Protonated orbital model,** white, in pack of 6.	10 packs	**£3·10**	Pack	**£0·37**	*b*
MV-934	**Lone pair (non bonding) orbital model,** red, in pack of 6 … …	10 packs	**£3·80**	Pack	**£0·44**	*b*
MV-936	**Benzene delocalised pi-orbital model,** green, in pack of 2 …	10 packs	**£2·20**	Pack	**£0·28**	*b*
MV-940	**Pi-orbital,** two lobed as in ethylene, in pack of 2.	10 packs	**£2·20**	Pack	**£0·28**	*b*
MV-942	**Pi-orbital,** three lobed as in acetate ion, in pack of 2.	10 packs	**£2·60**	Pack	**£0·32**	*b*
MV-950	**Stencil** for drawing orbital models.	Ten	**£1·50**	Each	**£0·22**	*b*
MV-952	**Scale card,** 0 to 3Å, in pack of 5.	10 packs	**£1·50**	Pack	**£0·22**	*b*
MV-954	**Instructions manual** … … …			Each	**£0·25**	*b*
MV-840	**Spring bonds** … … …	For full details and prices see entries in List No. sequence.				
MV-860	**Model atoms,** 4 hole … …					
MV-862	**Model atoms,** 5 hole … …					

All items on this page normally available from stock.

MOLECULAR WEIGHT APPARATUS



MW-020

MW-020

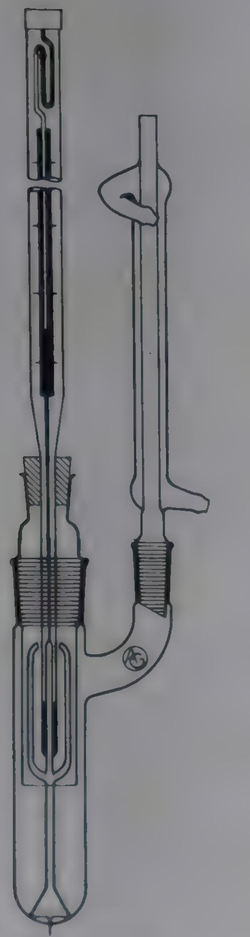
MOLECULAR WEIGHT APPARATUS, Beckmann freezing point method, as described by Findlay†. Comprises a stout glass cooling vessel 22·5 cm high and 12·5 cm diameter with a plated metal cover. Through this cover are fitted the various components; air jacket tube containing the freezing tube with side arm, siphon tube and nickel stirrer for the cooling vessel, test tube containing a glass tube for transferring crystals to the freezing tube, and a thermometer. The freezing tube accepts a Beckmann thermometer and stirrer and is fitted with a side arm to which a filling pipette is connected. **Without thermometers** ... Each **£9·45** *a*

REPLACEMENT PARTS

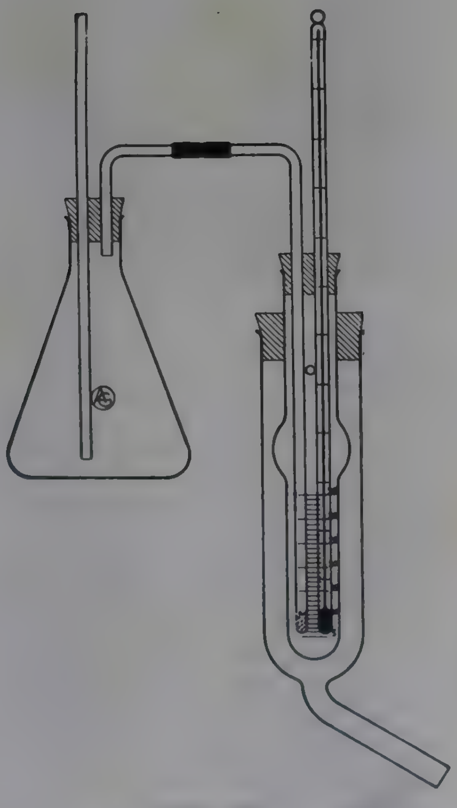
JE-100	**Cooling vessel,** 22·5 × 12·5 cm. See entry in List No. sequence.			
MW-024	**Freezing tube,** with side arm	Each	**£0·80**	*a*
MW-026	**Air jacket tube**	Each	**£0·27**	*a*

ACCESSORIES

TJ-174	**Thermometer,** for cooling vessel, B. 60C/100	For prices see entries in List No. sequence.
TJ-521	**Thermometer, Beckmann,** with top zero	



MW-090
with thermometer



MW-050
with thermometer

MW-050

MOLECULAR WEIGHT APPARATUS, Landsberger boiling point method. Comprises 150 ml conical flask connected to a glass tube graduated 5 to 35 cm³ in 1 cm³, with outer glass jacket. With bends and centre spray tube. **Without thermometer.**
Each **£3·55** *a*

REPLACEMENT PARTS

MW-052	**Inner tube,** graduated 5 to 35 cm³ ...	Each	**£1·05**	*a*
MW-054	**Outer jacket**	Each	**£0·65**	*a*
FJ-050	**Flask,** conical, 150 ml. For price see entry in List No. sequence.			

ACCESSORIES

CU-320	**Condenser,** Liebig, 25 cm, for connection to vapour outlet	For details and prices see entries in List No. sequence.
TJ-070	**Thermometer,** total immersion, range −5 to 105°C subdivided in 0·1degC ...	
TJ-523	**Thermometer, Beckmann,** with bottom zero	

MW-090

MOLECULAR WEIGHT APPARATUS, Washburn and Read boiling point method incorporating the Cottrell pump, as described by Findlay†. Comprises a boiling tube with a short tungsten wire sealed into the base to give steady heating, a 29/32 socket and a side arm with a 14/23 socket. A thermometer adapter with a cylindrical extension to shield the bulb fits into the main socket while a Liebig condenser fits into the side arm socket. The Cottrell pump rests inside the boiling tube and has three branches terminating above the bulb. **Without Beckmann thermometer** ... Each **£3·60** *a*

REPLACEMENT PARTS

MW-092	**Boiling tube,** with 29/32 and 14/23 sockets.	Each	**£1·15**	*a*
MW-094	**Thermometer adapter,** with 29/32 cone.	Each	**£0·55**	*a*
MW-096	**Cottrell pump**	Each	**£0·95**	*a*
MW-098	**Condenser, Liebig,** 20 cm, with 14/23 cone.	Each	**£0·95**	*a*

ACCESSORY

TJ-523 **Thermometer, Beckmann,** with bottom zero. For details and price see entry in List No. sequence.

TABLE PRESS for use with above apparatus see PU-210 in List No. sequence.

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† Findlay 'Practical Physical Chemistry' 1954.

All items on this page normally available from stock.

Gallenkamp HEITLER SEMI-MICRO EBULLIOMETER

- Molecular weight determinations of organic solids and liquids by boiling point elevation method
- Reaction kinetics studies using potentiometric recorder
- Polymerisation and saponification studies

Gallenkamp
EBULLIOMETER

PERFORMANCE AND OPERATION

Rapidly and accurately measures elevations down to 0·0005degC in the boiling points of organic solvents on the addition of the solutes. With chemical systems behaving normally, molecular weights of up to 500 may be determined to within 1%. For higher molecular weights, solution concentrations are smaller and the solvent must be stabilised. Molecular weights of 500 to 1000 may be determined to within 2%. Where known standards at comparable molecular weight and composition are available, molecular weights of 1000 to 5000 may be determined to about 3%.

CONSTRUCTION AND DIMENSIONS

A complete ebulliometer outfit comprises either one or two borosilicate glass ebulliometer vessels in heating stands, a thermistor bridge and a galvanometer, with connecting leads.

Vessel and heating stand

The vessel is a modified Cottrell pump with a tungsten wire fused into the base to conduct heat to the solution. Efficient boiling produces rapid circulation of an intimate foam of solution and vapour thus providing conditions under which the boiling point is precisely measured. Boiling temperature is sensed by a thermistor probe in the foam. The vapour condenses on a 'cold finger', and condensate returns steadily to the boiler. In this way a state of dynamic equilibrium is attained.

The stand comprises a base with heating element and control, surmounted by a plastics draught shield.

Thermistor bridge and galvanometer

The four decade bridge can either be connected to two vessels, one for measuring boiling point, the other compensating for changes in ambient pressure, or for less accurate work to the measuring vessel only. Resistance is measured to within 0·1 Ω. The galvanometer is a taut suspension type with a 6-position sensitivity control; coil resistance 1400 ohms; maximum sensitivity 180 mm/μA. For reaction kinetics studies the galvanometer must be replaced by a potentiometric recorder of sensitivity 2·5 mV and chart speed 60 cm/hr to 60 cm/day depending on reaction rate.

Dimensions and weights	H W D	Net wt.
Vessel and heating stand	36 × 18 × 17 cm	2·6 kg
Thermistor bridge	15 × 28 × 27 cm	3·5 kg
Galvanometer	16 × 19 × 28 cm	2·6 kg

BIBLIOGRAPHY

1. Heitler, C., Chem. & Ind. 1952, 875. A paper on original kinetic study work.
2. Heitler, C., Analyst 1958, 83, 223-229. The original paper describing the ebulliometer.
3. Heitler, C., J. Chem. Soc., 1963 4885-4889. An ebulliometric study of the kinetics of the Knoevenagel reaction.
4. Heitler, C., Talanta 11, 1081-1085. An ebulliometric study of the kinetics of the ethanolysis of ester groups.
5. Heitler, C., Talanta 1964, 11, 1471-1487. The most detailed survey of the sources of error in ebulliometric work, giving a clear account of the effects of stabilisers and describing methods of correction of results.

THERMISTOR BRIDGE
Gallenkamp

MW-140

MW-140

SEMI-MICRO EBULLIOMETER, *Gallenkamp*, **Heitler,** outfit comprising **one** vessel and heating stand, thermistor bridge with battery, galvanometer and instructions manual. For a.c. single phase supplies.

For 220/240V	Each	£182·00	g
For 200/210V	Each	£183·00	gN
For 110/120V	Each	£183·00	gN

MW-145

SEMI-MICRO EBULLIOMETER, *Gallenkamp*, **Heitler,** outfit as MW-140 but includes **two** vessels and heating stands (one for measuring and the other for compensating). For a.c. single phase supplies.

For 220/240V	Each	£221·00	g
For 200/210V	Each	£222·00	gN
For 110/120V	Each	£222·00	gN

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

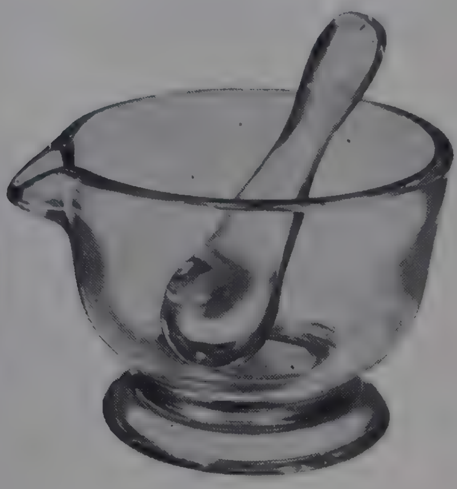
MW-152	**Ebulliometer vessel**	Each	£4·20	a
MW-154	**'Cold finger' condenser**	Each	£0·75	a
MW-156	**Thermistor element,** pre-aged, in ptfe cone. For use in MW-140	Each	£5·00	b
MW-158	**Thermistor elements,** matched pair of MW-156. For use in MW-145	Pair	£10·50	b
MW-160	**Battery,** 9V *Ever-Ready* type PP11 ...	Each	£0·27	m
MF-380	**Heating element,** for heating block (two required). For price see entry in List No. sequence.			

ACCESSORIES

EF-680	**Recorder,** *Smiths* ...	For details and prices see entries in List No. sequence.
PU-210	**Tablet press** ...	

Items on this page normally available from stock except those coded *N*.

MW-730
MW-735



MW-770

MW-730

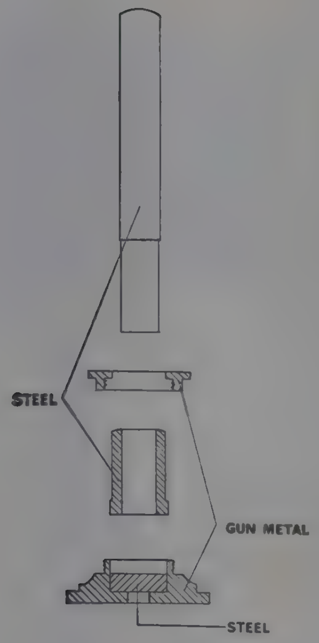
MORTARS AND PESTLES, vitreous porcelain, unglazed. Pestles have wooden handles.

Outside dia.	8	9	11	13 cm	
Capacity approx.	60	115	200	280 ml	
Ten	**£7·80**	**9·00**	**11·00**	**12·00**	c
Each	**£0·86**	**1·00**	**1·25**	**1·35**	
Outside dia.	16·5	20	25	30·5 cm	
Capacity approx.	570	1100	2300	4500 ml	
Ten	**£16·50**	**23·50**	**35·00**	—	c
Each	**£ 1·85**	**2·65**	**3·90**	**6·30**	

MW-735

MORTARS AND PESTLES, vitreous porcelain, completely glazed. Pestles have wooden handles.

Outside dia.	8	9	11	13 cm	
Capacity approx.	60	115	200	280 ml	
Ten	**£10·80**	**12·80**	**15·50**	**16·00**	c
Each	**£ 1·20**	**1·45**	**1·75**	**1·80**	
Outside dia.	16·5	20	25	30·5 cm	
Capacity approx.	570	1100	2300	4500 ml	
Ten	**£22·00**	**32·00**	**46·00**	—	c
Each	**£ 2·45**	**3·60**	**5·10**	**8·50**	



MW-800

MW-820

MW-770

MORTARS AND PESTLES, glass, with foot and spout.

Outside dia.	5	8	11	15	20 cm	
Capacity approx.	30	80	230	850	1500 ml	
Ten	**£4·70**	**5·40**	**6·80**	**12·00**	**23·00**	c
Each	**£0·52**	**0·60**	**0·76**	**1·35**	**2·55**	

MW-800

MORTARS AND PESTLES, percussion, **steel.** The hardened steel mortar comprises a cylindrical body with separate bottom plug which are held together by a two-piece gunmetal base, the whole being readily dismantled for cleaning. The close fitting cylindrical pestle is of hardened steel.

Dia. of pestle	17	28 mm	
Each	**£6·25**	**9·00**	c

***MW-820**

MORTARS AND PESTLES, agate, highly polished. The natural stone is cut so that working area is as free as possible from blemishes.

Dia. external	40	57	70	85	100 mm	
Dia. internal	34	51	60	76	87 mm	
Each	**£5·80**	**7·00**	**9·25**	**14·50**	**21·00**	c

MW-830

MW-830

MORTAR AND PESTLE, boron carbide, a very pure hard material suitable for grinding analytical samples. The mortar, which has a highly polished face, is 57 mm internal diameter and 17 mm deep. The pestle has an aluminium handle with boron carbide tip. Complete in case ... ... Each **£120·00** *fN*

For **Mechanical Mortars and Pestles** see MU-300 and MU-400 in List No. sequence.

Items on this page normally available from stock except those coded *N.*

VARIABLE SPEED MOTORS

MX-550

MOTORS, series wound, geared. A fan cooled motor in drip-proof frame with integral ON/OFF switch and speed controlling potentiometer. Output shaft, diameter $\frac{5}{16}$ in, supplied in position shown is readily adjustable to any of twelve positions set at 30° to each other. Overall dimensions 23×9×9 cm. For 200/250V a.c. supplies only.

On-load speed range approx.

Rev/min min.	5	2
Rev/min max.	25	10
Torque kgf cm	4·7	4·7
Both ranges	Each	**£22·50** *mN*

When ordering please specify voltage and frequency of supply and speed range required.

MX-560

MOTOR, universal, series wound, electronically controlled, *Hanovia* Model 101, incorporating motor MX-606 and providing an infinitely variable speed control between zero and 86 rev/min, with a final shaft torque of 5·7 kgf cm at maximum speed. The motor field is energised by d.c. from a rectifier and the armature is supplied with regulated pulses of energy through a thyratron valve. Speed control is effected either by a pre-set potentiometer regulating the phase of the input a.c. to the valve grid or by a separate, manually operated potentiometer regulating the mean d.c. potential at the grid. For 220/240V 50/60 Hz supplies ... Each **£35·50** *fN*

When ordering please state voltage and frequency of supply.

UNIVERSAL MOTORS

TO BS 170

With stove enamelled frames, leak-proof life-sealed bearings and enclosed cooling fans. Rotation is counterclockwise and speeds quoted are approximate for a.c. operation. **These are not constant speed motors.** The speeds achieved in operation are dependent on the loads applied.

MX-602

MOTORS, universal, series wound, as specification. Overall dimensions 16×9×9 cm high. Output shaft diameter $\frac{5}{16}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min, no load	8000	11000	13000	
Rev/min, full load	2500	4000	6500	
hp, approx	1/50	1/20	1/10	
Input,W	40	85	140	
All ranges		Each	**£11·50**	c

MX-606

MOTORS, universal, series wound, as specification, with single reduction gear. Overall dimensions 18×9×11 cm high. Output shaft diameter $\frac{3}{8}$ in. For 220/240V a.c. single phase or d.c. supplies.

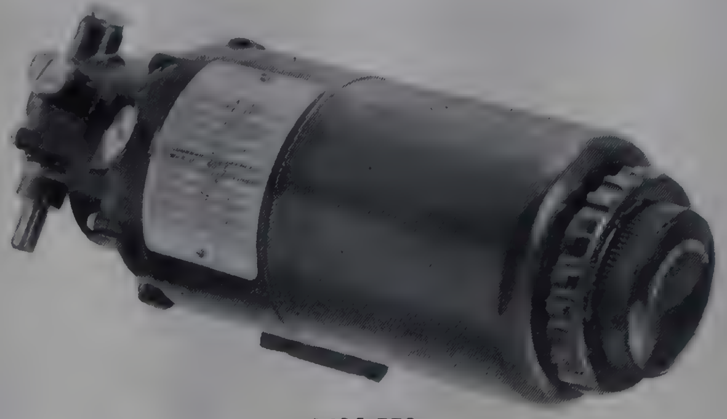
Rev/min, full load	50	100	200	500	
hp approx.	1/20	1/15	1/15	1/15	
Full load torque kgf cm	25	17	12	5	
All ranges			Each	**£17·50**	c

MX-610

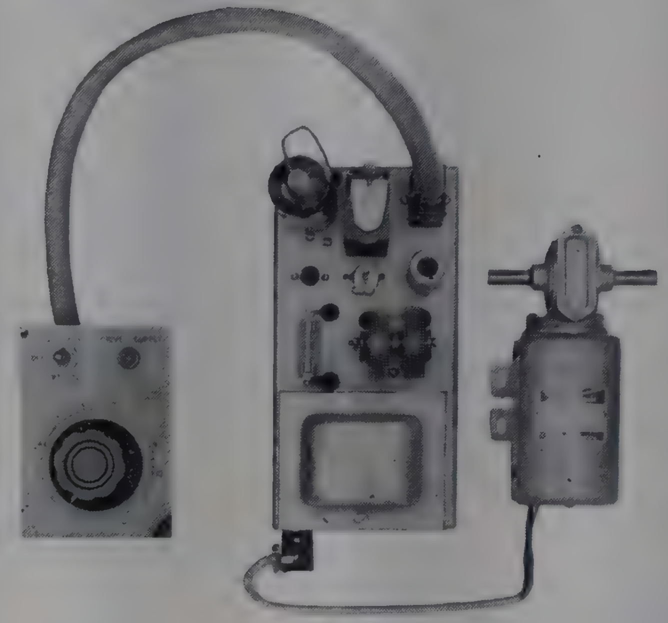
MOTORS, universal, series wound, as specification, with double reduction gear. Overall dimensions 20×11×13 cm high. Output shaft diameter $\frac{3}{8}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min, full load	5	10	
hp approx.	1/50	1/20	
Full load torque kgf cm	40	40	
Both ranges	Each	**£24·00**	c

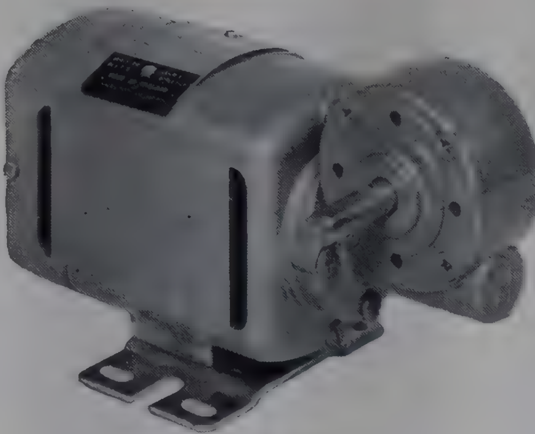
When ordering universal motors please specify speed range required.



MX-550



MX-560



MX-606

ACCESSORIES

MX-720 **Pulleys,** aluminium, with two V grooves. To fit $\frac{5}{16}$ in diameter shafts.

Size No.	1	2	
Diameter of V grooves	1 and $1\frac{1}{2}$	$1\frac{1}{2}$ and $2\frac{3}{8}$ in	
Each	£0·75	1·00	c

MX-721 **Pulleys** as MX-720, but to fit $\frac{3}{8}$ in diameter shafts.

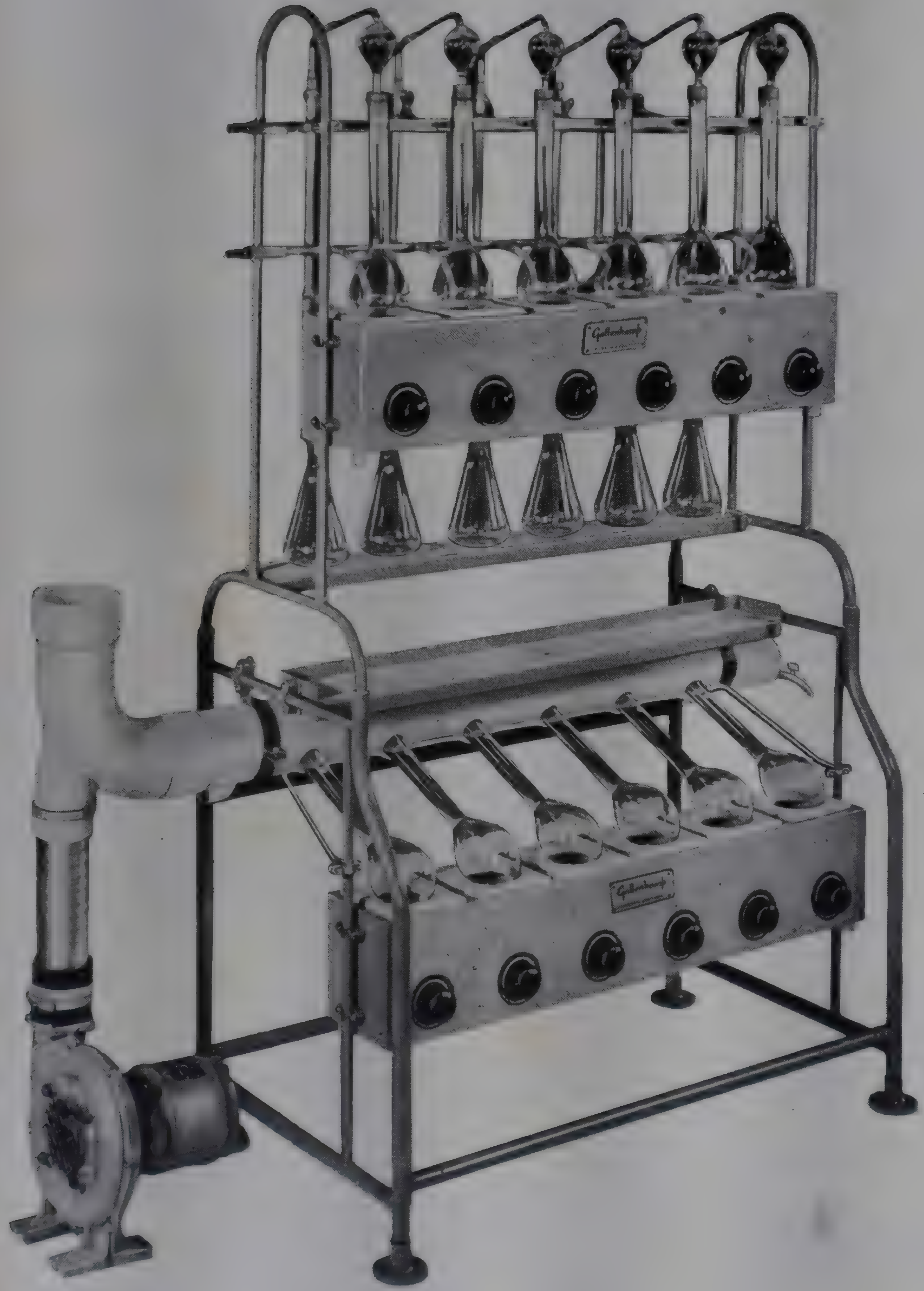
Size No.	1	2	
Diameter of V grooves	1 and $1\frac{1}{2}$	$1\frac{1}{2}$ and $2\frac{3}{8}$ in	
Each	£0·75	1·00	c

MX-763 **Belting, nylon braided** diameter 3 mm. Comprises rubber core covered with nylon braiding impregnated with synthetic rubber. These circular cross section, endless belts provide the necessary elasticity for driving with the right degree of tension, prevent slipping and save wear on bearings as the tension is low and unaffected by changes in humidity.

Length	75	100 cm	
Each	£0·20	0·20	c

Items on this page normally available from stock except those coded *N*.

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT



Typical arrangement of *Gallenkamp* universal Kjeldahl equipment arranged for electric heating and permitting simultaneous digestion of 6 samples and distillation of 6 further samples.

This range of equipment for determination of nitrogen by the Kjeldahl method comprises a versatile series of interchangeable components which can be assembled in many ways to meet individual requirements. The units are based on a bank of 6 tests and can be extended in multiples of 6 as required.

HEATERS

Three alternatives are available, all of which can be used for digestion or distillation.

NR-080	Electric with individual energy regulator controls, suitable for flasks 300 to 1000 ml.
NR-090	Gas with individual tap controls, suitable for flasks 300 to 800 ml.
NR-100	Electric heating mantles with individual energy regulator controls, suitable for flasks 100 to 500 ml.

STANDS

For **digestion** purposes three alternatives are available.

The simplest, for use in a fume cupboard, comprises flask rest NR-022 on support rods NR-094 mounted on the ends of a heater unit.

For open bench use the above can be supplied together with vapour tube stand NR-010—see NP-900 on next page.

For permanent installations NR-020 is recommended. For **distillation** purposes NR-030 is used—see NP-910 on next page. This may be stood on a bench or mounted on top of the digestion stand NR-020 for combined digestion and distillation—see NP-920 on next page.

CONDENSERS

These may be individually jacketed Liebig condensers or a single cooling tank may be used. In either case the inner tubes may be of glass or monel metal with ends bent to suit upward or downward sloping stillheads. When individual condensers are used rack NR-036 provides support combined with water inlet and outlet manifolds.

FUME EXTRACTION

A comprehensive range of components fabricated in rigid PVC enables the assembly of an ejector extraction system to suit any location.

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

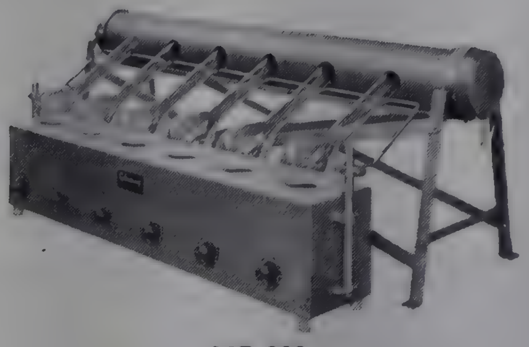
NP-900

KJELDAHL DIGESTION ASSEMBLY, *Gallenkamp*, comprising:

NR-080	1 × Heater unit for 500 ml Kjeldahl flasks.
NR-094	2 × Support rods.
NR-022	1 × Flask rest.
NR-010	1 × Vapour tube bench stand.
NR-120	1 × Vapour tube.
NR-124	1 × End cap.
NR-174	Welding solution.
FJ-160	6 × Kjeldahl flasks, capacity 500 ml.

For 220/240V a.c. single phase supplies.	Each	**£92·00**	*g*
For 200/210V a.c. single phase supplies.	Each	**£94·00**	*gN*
For 110/120V a.c. single phase supplies.	Each	**£94·00**	*gN*

NOTE: NR-120 terminates in a socket to fit trunking NR-160 et seq.

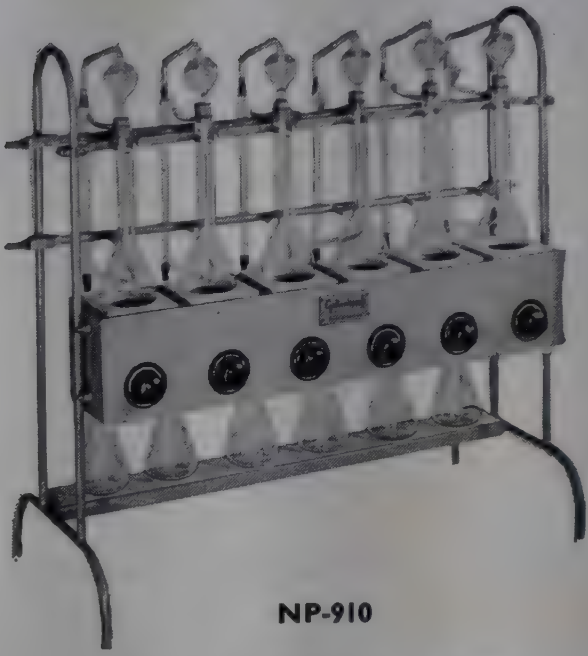

NP-900

NP-910

KJELDAHL DISTILLATION ASSEMBLY, *Gallenkamp*, comprising:

NR-080	1 × Heater unit for 500 ml Kjeldahl flasks.
NR-030	1 × Distillation stand.
NR-032	1 × Flask holder for 500 ml Kjeldahl flasks.
NR-036	1 × Condenser rack.
FJ-160	6 × Kjeldahl flasks, capacity 500 ml.
NR-215	6 × Rubber stoppers, size No. 29, drilled 10 mm hole.
NR-200	6 × Splash heads.
NR-210	6 × Condensers.
TX-750	1 metre Tubing to connect NR-200 to NR-210, Size N8.
NR-224	6 × Safety bulbs.
FJ-050	6 × Conical flasks, capacity 500 ml.

For 220/240V a.c. single phase supplies.	Each	**£118·00**	*g*
For 200/210V a.c. single phase supplies.	Each	**£120·00**	*gN*
For 110/120V a.c. single phase supplies.	Each	**£120·00**	*gN*


NP-910

NP-920

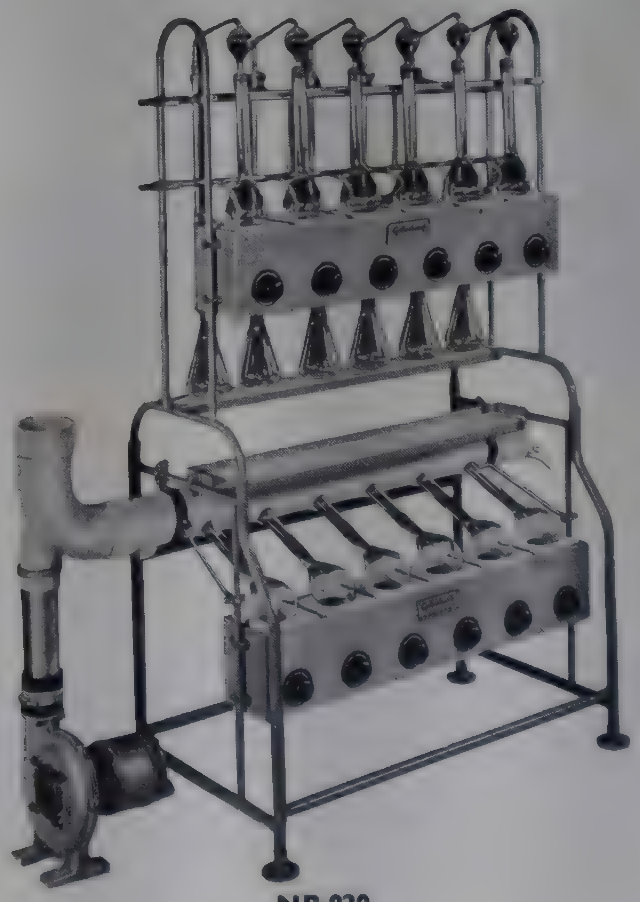
KJELDAHL DIGESTION AND DISTILLATION ASSEMBLY, *Gallenkamp*, comprising:

NR-080	2 × Heater units for 500 ml Kjeldahl flasks.
NR-020	1 × Floor stand.
NR-022	1 × Flask rest.
NR-030	1 × Distillation stand.
NR-032	1 × Flask holder for 500 ml Kjeldahl flasks.
NR-036	1 × Condenser rack.
FJ-160	12 × Kjeldahl flasks, capacity 500 ml.
NR-215	6 × Rubber stoppers, size No. 29, drilled 10 mm hole.
NR-200	6 × Splash heads.
NR-210	6 × Condensers.
TX-750	1 metre Tubing to connect NR-200 to NR-210, Size N8.
NR-224	6 × Safety bulbs.
FJ-050	6 × Conical flasks, capacity 500 ml.
NR-120	1 × Vapour tube.
NR-124	1 × End cap.
NR-132	1 × Ejector unit.
NR-174	Welding solution for joining above three items.
NR-140	1 × Fan.
NR-144	18 in Flexible metallic tubing.
NR-146	1 × Connecting sleeve.
NR-148	2 × Hose clips.

For 220/240V a.c. single phase supplies.	Each	**£295·00**	*g*
For 200/210V a.c. single phase supplies.	Each	**£299·00**	*gN*

NOTE: The fan and fume ejector unit is suitable for an ejection path of up to 600 cm (20 ft) either straight or with one bend. The ejector unit terminates in a socket to fit trunking NR-160 et seq.

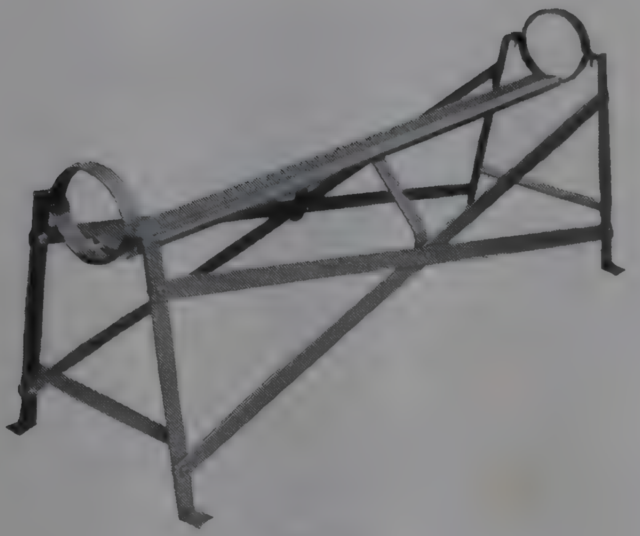
When ordering Kjeldahl Assemblies please specify voltage and frequency of supply.


NP-920

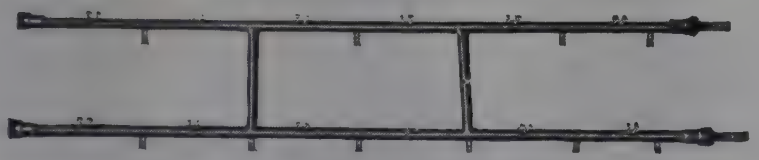
Items on this page normally available from stock except those coded *N*.

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

STANDS AND FITTINGS


NR-010

NR-022


NR-036

NR-040

NR-042
NR-044

NR-043
NR-045

NR-010
BENCH STAND, for mounting vapour tube NR-120 at a centre distance of about 40 cm above the bench top. Made from rust-proofed steel finished in stoved grey enamel ... ... Each **£13·25** *b*

NR-020
FLOOR STAND, for *Gallenkamp* 6-test digestion unit and for supporting distillation assemblies mounted on stand NR-030. Tubular steel construction finished in stoved grey enamel, with rubber lined shelf to support the receiving flasks. Overall dimensions 100 × 60 × 77 cm high (see illustration on previous page). Each **£44·00** *b*

NR-022
FLASK REST, for use with heaters NR-080, NR-090 and NR-100 to form a simple digestion unit which may be used in a fume cupboard. Made from stainless steel crimped to support flask necks and fitted with clamps to fit stand NR-020 or support rods NR-094. Each **£4·50** *b*

NR-030
DISTILLATION STAND, for *Gallenkamp* Kjeldahl distillation unit, constructed of strong tubular steel to take heaters NR-080, NR-090 and NR-100, flask holder NR-032, condenser rack NR-036 and condenser tank NR-040. A rubber lined shelf is fitted to take 500 ml conical receiving flasks. The flasks may be lowered at the end of the distillation process for draining the condenser tubes. The stand is rust-proofed and finished in stoved grey enamel. Overall dimensions 97 × 43 × 107 cm high (see illustration on previous page). Each **£15·50** *b*

NR-032
FLASK HOLDER, for *Gallenkamp* Kjeldahl distillation unit, comprising a bar with six spring clips to grip the necks of distillation flasks. The holder clamps to stand NR-030.

To take flasks	300/500	800/1000 ml	
Each	**£4·50**	**4·65**	*b*

NR-036
CONDENSER RACK, for *Gallenkamp* Kjeldahl distillation unit, constructed of tubular copper with spring clips suitable to take 30 cm Liebig condensers NR-210 and NR-212. The horizontal tubes of the rack form the water supply and waste pipes and are fitted with corrugated nozzles for rubber tubing connections to the six condensers which operate in parallel for equal efficiency ... ... Each **£24·75** *b*

NR-040
CONDENSER COOLING TANK, for *Gallenkamp* Kjeldahl distillation unit to clamp to stand NR-030. Comprises a stoved grey enamelled copper tank with tubulures at top and bottom into which six monel metal or glass condenser tubes may be fitted using rubber stoppers NR-215, size 23. The tank is narrow in order that the water entering at one end flows rapidly through to the outlet and efficiently cools the condenser tubes. Dimensions 92 × 5 × 30 cm high. **Without condenser tubes or stoppers** ... ... Each **£37·50** *b*

ACCESSORIES

NR-215	Stopper, rubber, size 23, to fit tubulures of above tank and bored 10 mm to take condenser tube. For price see entry in List No. sequence.					
NR-042	**Condenser tube,** monel metal, with downward sloping limb	Ten	£46·00	Each	£5·10	*b*
NR-043	**Condenser tube,** monel metal, with upward sloping limb	Ten	£46·00	Each	£5·10	*b*
NR-044	**Condenser tube,** glass, downward sloping limb.	Ten	£1·25	Each	£0·19	*a*
NR-045	**Condenser tube,** glass, upward sloping limb.	Ten	£1·25	Each	£0·19	*a*

All items on this page normally available from stock.

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

6-TESTS HEATER UNITS

The *Gallenkamp* electric and gas units and the *Electrothermal* electric unit have similar fittings by which they can be suspended on stands NR-020 or NR-030. When used as free-standing units, a pair of support rods NR-094 may be attached to the *Gallenkamp* heater units for fitting flask rest NR-022. The *Electrothermal* heater unit is supplied with a pair of support rods and a flask rest. Overall width of each unit is 97 cm.

Gallenkamp

NR-080 with NR-094 and NR-022

NR-080

HEATER UNIT, *Gallenkamp*, electric, comprising six nickel-chromium spiral elements on fireclay formers mounted in an enamelled steel case. The elements have good thermal insulation and each has a replaceable asbestolite cover for supporting a flask. The heaters are individually controlled by energy regulators. **Supplied with asbestolite covers NR-086, for flasks size 500 ml. Without support rods or flask rest.** Maximum load 3 kW.

For 220/240V a.c. single phase supplies.	Each	**£65·50**	*b*
For 200/210V a.c. single phase supplies.	Each	**£67·50**	*bN*
For 110/120V a.c. single phase supplies.	Each	**£67·50**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS AND ACCESSORIES

NR-086 **Asbestolite covers.**

Flask size	300	500	800/1000 ml	
Set of 6	**£5·00**	**5·00**	**5·00**	*b*

NR-088	**Heating element,** 500W	Each	**£1·35**	*b*
NR-094	**Support rod.** See entry below.			

When ordering replacement parts please specify serial number of unit and frequency of electrical supply.

Gallenkamp

NR-090 with NR-094 and NR-022

NR-090

HEATER UNIT, *Gallenkamp*, gas, comprising a bank of six burners with individual control taps mounted inside a stove enamelled steel case. Each burner is surrounded by heat insulating material and is supplied with a dished rust resistant iron wire gauze cover. **For operation on town (coal) gas** ... ... Each **£54·00** *b*

NR-091

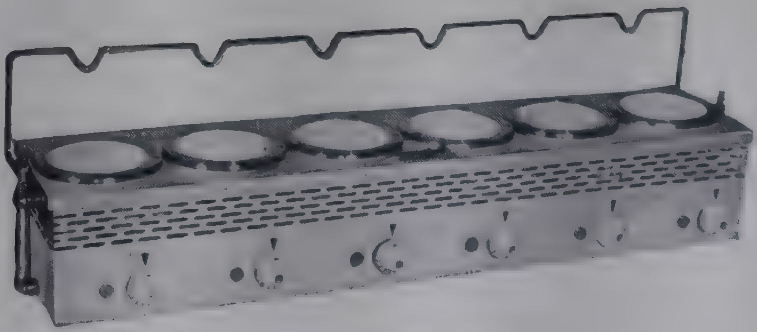
HEATER UNIT, *Gallenkamp*, as NR-090 but for operation on natural (methane) gas ... ... Each **£56·00** *b*

REPLACEMENT PART for NR-090 aed NR-091

NR-092	**Wire gauze cover**	Pack of 6	**£2·40**	*b*

ACCESSORIES for NR-090 and NR-091

NR-094	**Support rods,** for holding flask rest NR-022.	Pair	**£0·85**	*b*
NR-022	**Flask rest.** For details and price see entry in List No. sequence.			



NR-100

NR-100

HEATER UNIT, *Electrothermal*, electric. Comprising a bank of six heating mantles mounted in an aluminium case. Each heater is controlled by an energy regulator and there is an indicator light for each circuit. With support rods and flask rest. For 100/120, 200/220 or 230/250V a.c. single phase supplies.

Ref. No.	MQ3866	MQ3867	
Flask sizes	100/300	500 ml	
Maximum load	1·8	2·7 kW	
Each	**£99·30**	**117·00**	*mN*

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

Gallenkamp UNIVERSAL KJELDAHL EQUIPMENT

FUME EXTRACTION

Small numbers of digestions may be carried out in a fume cupboard using a heater bank and flask rest. This method is not recommended for more than occasional use because of the risk of sulphuric acid fumes causing damage to the heater and fume extraction system.

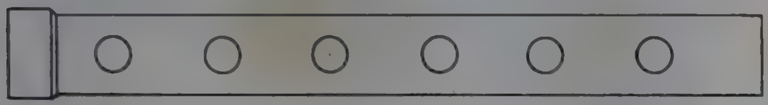
A fume extraction system fabricated in rigid PVC is available for routine work and may be installed in any laboratory.

The fumes are extracted by an ejector and exhausted outside the building through PVC trunking.

All components are listed separately so that a selection can be made to suit any particular location. The vapour tube, end cap, and ejector unit can be assembled either way round to provide exhaust on left or right.

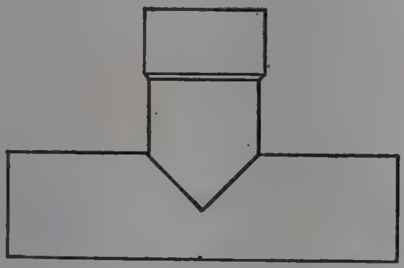
Socket ends are of a size to fit accurately over plain ends. Temporary joints may be made with a smear of grease. Permanent joints are made by painting both components with welding solution and pushing them together.

NOTE: This type of installation is suitable for an ejection path of up to 20 ft (600 cm), either straight or with one bend. We will be pleased to offer ejection systems for more complex situations on receipt of full details and dimensioned sketch of site.

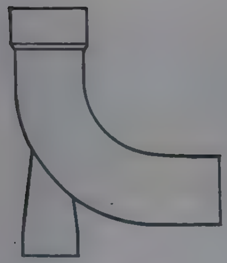


NR-120

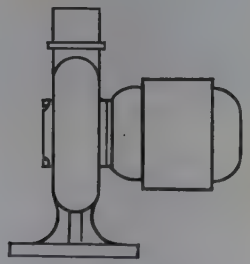
NR-124



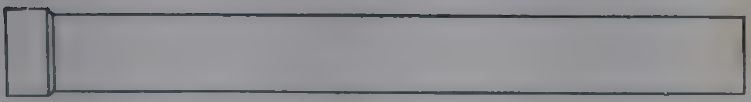
NR-128



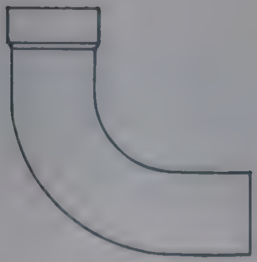
NR-132



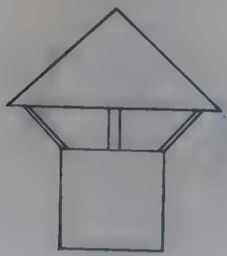
NR-140



NR-160



NR-164



NR-170

NR-120
VAPOUR TUBE, PVC, 4 in (10 cm) internal diameter, overall length 3 ft 6 in (107 cm), with six holes to take necks of digestion flasks up to 1000 ml capacity. Socket at one end for fixing to ejector ... Each **£7·50** *b*

NR-124
END CAP, PVC, with drain tube, to fit vapour tube NR-120 ... ... Each **£5·00** *b*

NR-128
T-TUBE, PVC, with socket on central limb, for central fume extraction from two vapour tubes NR-120. Each **£6·00** *b*

NR-132
EJECTOR UNIT, PVC, all-welded construction, capable of efficient fume extraction from up to two vapour tubes NR-120 connected in series or parallel. Requires fan NR-140, flexible metallic tubing NR-144, sleeves NR-146 and clips NR-148 ... Each **£16·00** *b*

NR-140
FAN, 9 in (23 cm) diameter, with integral $\frac{1}{6}$ hp induction motor and condenser. For 200/250V 50 Hz single phase supplies. Suitable for ejection path not exceeding 600 cm (see Note above) ... ... Each **£43·00** *m*

NR-144
FLEXIBLE METALLIC TUBING, 3 in (7·5 cm) diameter, for connecting fan NR-140 to ejector unit NR-132. **Without rubber connecting sleeves or hose clips** ... ... Per ft **£0·55** *c*

NOTE: Fan on floor to ejector unit on stand NR-010 on 3 ft bench requires 3 ft (92 cm). Fan to ejector unit on stand NR-020 requires 1 ft 6 in (46 cm).

NR-146
CONNECTING SLEEVE, canvas lined rubber, for connecting NR-144 to fan NR-140 and ejector NR-132. Each **£0·40** *c*

NR-148
HOSE CLIPS, for above ... Set of 2 **£0·30** *c*

NR-160
TUBES, PVC, 4 in (10 cm) internal diameter, with socket at one end.

Length overall	3 (92)	5 ft (127) cm	
Each	**£3·50**	**4·70**	*b*

NR-164
ELBOW, PVC, 90°, with socket at one end. Each **£8·00** *b*

NR-170
COWL, PVC ... ... Each **£8·25** *b*

NR-174
WELDING SOLUTION, sufficient for ten joints, in can containing $\frac{1}{2}$ pint (280 ml) ... Per can **£0·75** *c*

All items on this page normally available from stock.

(AG) BENCHBLOWN GLASSWARE FOR NITROGEN DETERMINATION

The specimen assemblies of Kjeldahl glassware illustrated are suitable for use with *Gallenkamp* Universal Kjeldahl Equipment and show two of the many combinations possible by selection from the glassware listed below.

NR-200
SPLASH HEAD, Kjeldahl type, (AG), borosilicate glass. Length of side tube 15 cm, sloping downwards.
Ten **£6·00** Each **£0·66** *a*

NR-204
SPLASH HEAD, (AG), as NR-200 but with side tube sloping upwards. Ten **£6·00** Each **£0·66** *a*

NR-210
CONDENSER, Liebig type, (AG), borosilicate glass, comprising inner tube with end bent up to match splash head NR-200 and 30 cm long jacket attached by rubber tubing ... ... Ten **£5·30** Each **£0·59** *a*

NR-212
CONDENSER, (AG), as NR-210 but with inner tube bent down to match splash head NR-204.
Ten **£5·30** Each **£0·59** *a*

REPLACEMENT PARTS

NR-044	**Inner tube, for NR-212 ...**	For prices see entries in List No. sequence.
NR-045	**Inner tube, for NR-210 ...**	

NR-215
STOPPERS, natural red rubber, bored with 10 mm hole to connect splash heads to flasks and condenser tubes NR-042 to NR-045 to tank NR-040. In packs of 6.

Stopper size For flask size	23 300	29 500/800	31 1000 ml	
10 packs	**£3·50**	**4·80**	**6·40**	*b*
Pack	**£0·41**	**0·53**	**0·72**	

TX-750
TUBING, neoprene, size N8, to connect splash head to condenser. For details and price see entry in List No. sequence.

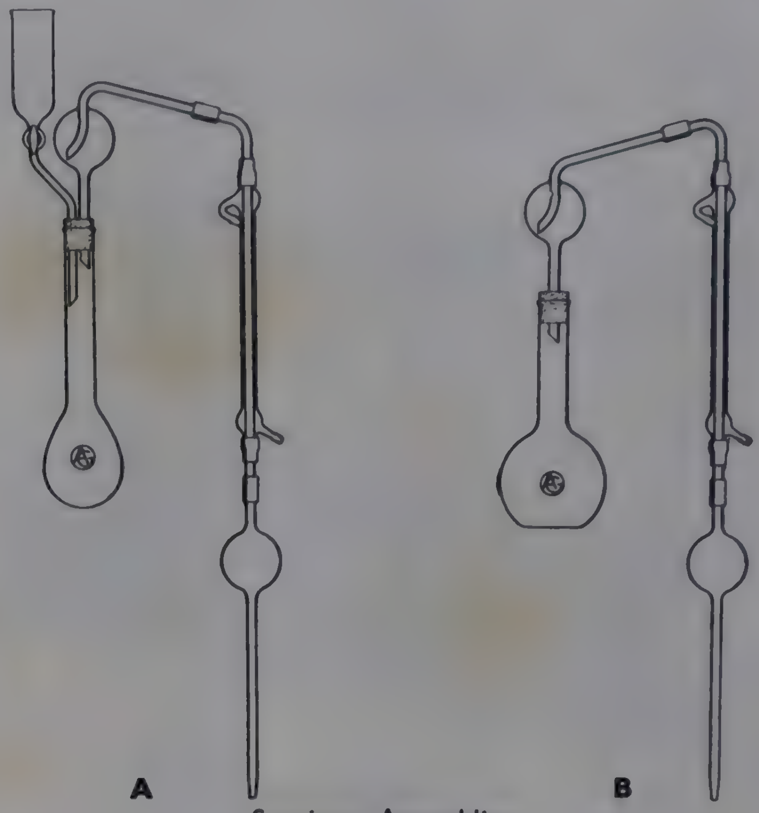
NR-220
TAP FUNNEL, (AG), cylindrical dropping, open top, 100 ml, with stem bent to clear splash head.
Ten **£6·80** Each **£0·76** *a*

NR-224
SAFETY BULB ABSORBER TUBE, (AG), for use with 500 ml conical flasks.
Ten **£2·20** Each **£0·28** *a*

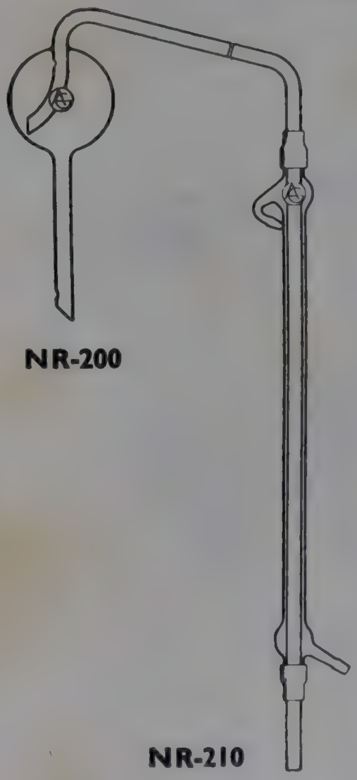
NR-230
BULB STOPPER, (AG), for Kjeldahl flasks.
Ten **£0·92** Each **£0·16** *a*

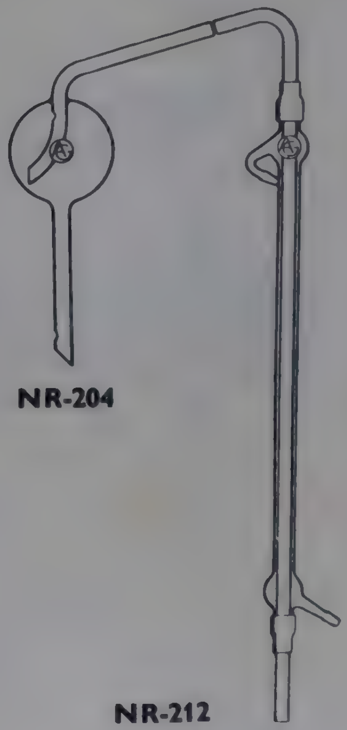
Flasks for use in Kjeldahl determinations

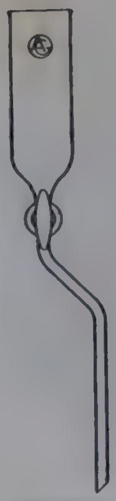
KJELDAHL FLASKS	300 to 800 ml see FJ-160	For details and prices see entries in List No. sequence.
ROUND BOTTOM FLASKS	500 and 1000 ml see FJ-010	
CONICAL FLASKS	500 ml see FJ-050 to FJ-052	

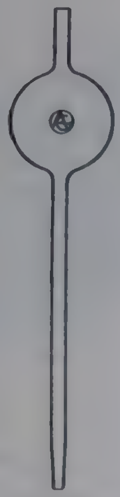


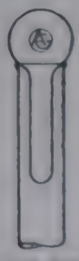
Specimen Assemblies


NR-200
NR-210


NR-204
NR-212


NR-220

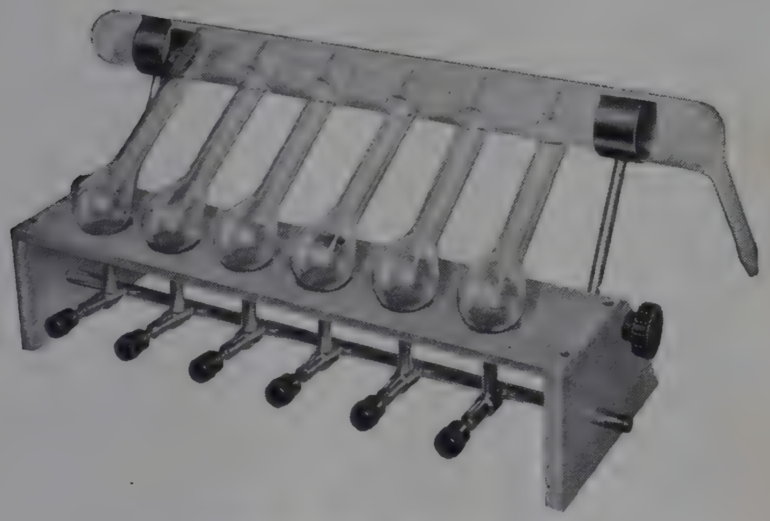

NR-224


NR-230

All items on this page normally available from stock.

Gallenkamp MICRO-KJELDAHL APPARATUS

NR-410 with exhaust tube and flasks



NR-420 with exhaust tube and flasks

NR-510

DIGESTION STANDS

NR-410

DIGESTION STAND, MICRO-KJELDAHL, *Gallenkamp*, electrically heated, to hold six 30 ml digestion flasks FJ-170. Constructed of sheet metal with asbestolite heating unit and ends. Heating is by nickel-chromium spirals designed so that each flask receives the same heat input. Adjustable spring clips are fitted to support a glass exhaust tube. For 220/240V a.c. single phase or d.c. supplies. **Without flasks or exhaust tube.**

Each **£34·00** *b*

Also available for other voltages to order.

REPLACEMENT PART

NR-412 Heating element ... ... Each **£0·80** *b*

NR-420

DIGESTION STAND, MICRO-KJELDAHL, *Gallenkamp*, gas heated, to hold six 30 ml digestion flasks FJ-170. The stand is constructed in asbestolite and has six positions. The burner tube has six gas jets with individual control valves. Spring clips on adjustable arms support the exhaust tube. Supplied with six wire gauzes but **without flasks or exhaust tube. For town (coal) gas.**

Each **£9·50** *b*

REPLACEMENT PART

NR-422 Wire gauze ... ... Pack of 12 **£0·40** *b*

NR-450

EXHAUST TUBE, borosilicate glass, to BS 1428 Part B1 with six holes at centre distances of 55 mm, and tubulure for pump connection.

Ten **£15·00** Each **£1·70** *a*

NR-452

EXHAUST TUBE, as NR-450 but with larger holes to conform with BS 1428 Part B3.

Ten **£17·50** Each **£1·95** *a*

†KING TYPE DIGESTION STAND

A micro-Kjeldahl digestion stand used for non-protein nitrogen and other determinations. May be used also for total base and many other estimations, using either flasks, tubes, crucibles or digestion/centrifuge tubes NR-530, where variable and controlled heating is required.

Design

The stand will hold 24 tubes up to 150×19 mm, with a minimum length of 75 mm. The tubes rest against a stainless steel support. The heating elements are nickel-chromium spirals in fireclay formers, mounted on asbestos boards contained in a sheet metal frame. There are two heaters which heat the bottom and sides of the tubes, respectively. Heating can be controlled to give gentle bottom heat with high top heat to drive off water without refluxing, gentle bottom and top heat and finally full bottom heat to complete the digestion.

NR-510

DIGESTION STAND, MICRO-KJELDAHL, *Gallenkamp*, as specification, electrically heated for 220/240V a.c. single phase or d.c. supplies. Each **£35·00** *b*

Also available for other voltages to order.

REPLACEMENT PART

NR-512 Heating elements, set of two... ... Set **£1·10** *b*

When ordering please state voltage and frequency of supply.

NR-530

TUBES, digestion/centrifuge,† borosilicate glass, 110 mm×16·5 mm o.d. with constriction approximately 19 mm from bottom. For ultra-micro-Kjeldahl-Nessler determination of nitrogen in protein. The same tube is used for both centrifuging and digestion.

Ten **£1·00** Each **£0·17** *a*

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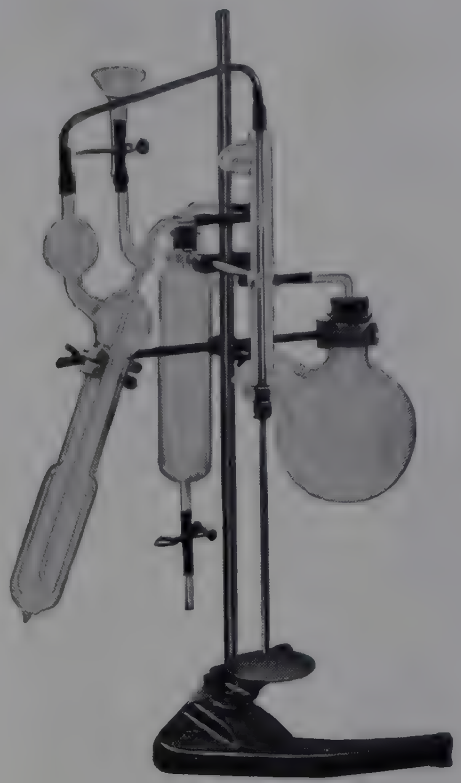
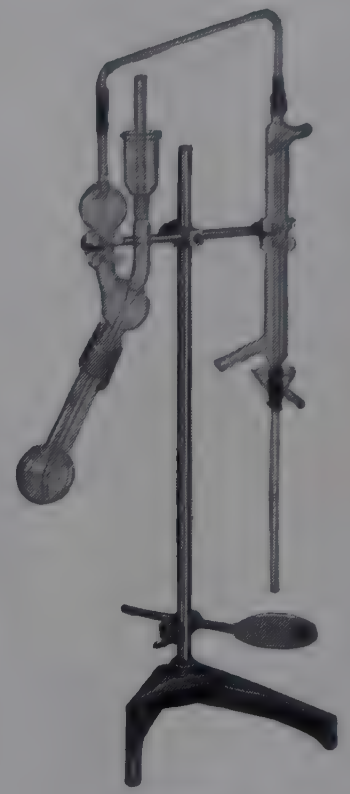
† King and Wootton, 'Micro-Analysis in Medical Biochemistry', 3rd Ed., p. 17, Churchill, London.

All items on this page normally available from stock.

(AG) MICRO-KJELDAHL
DISTILLATION APPARATUS


NR-650


NR-660

To BS 1428 Part B1 with Parnas-Wagner automatic discharge arrangement. The digestion products are introduced into the vacuum jacketed distillation vessel, treated with alkaline reagents and steam distilled. Steam is generated in the bolthead flask. The ammoniacal distillate is led through the splash head and condenser into a flask containing suitable absorbent solution. At the end of the distillation, removal of the heat source from the steam generator causes a partial vacuum in the system which transfers the contents of the distillation vessel into the cylindrical waste receiver leaving the distillation vessel empty for the next test.

The components of the apparatus are mounted on a 60 cm retort stand by means of plastics covered spring clips.

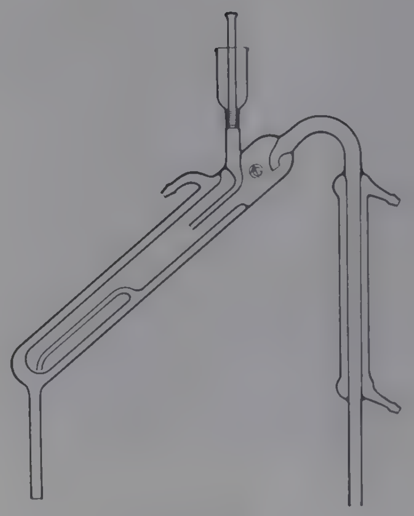
NR-650

DISTILLATION APPARATUS, micro-Kjeldahl, with automatic discharge, (AG) borosilicate glass, to BS 1428 Part B1, and as specification ... ... Each **£24·50** *b*

REPLACEMENT PARTS

NR-652	**Distillation flask,** with vacuum jacket.	Each	**£4·00**	*a*
NR-653	**Receiver,** cylindrical	Each	**£1·00**	*a*
NR-654	**Condenser jacket**	Each	**£0·60**	*a*
NR-655	**Condenser tube,** silver	Each	**£10·00**	*m*
NR-656	**Condenser funnel**	Each	**£0·55**	*a*
NR-657	**Sample funnel,** 50 mm dia.	Each	**£0·45**	*a*
NR-658	**Steam generating flask,** 1 litre ...	Each	**£0·75**	*a*

Suitable **100 ml conical flask** to receive distillate see FJ-050 in List No. sequence.


NR-680

To BS 1428 Part B3, non-transference pattern. The same flask is used for digestion and distillation. After digestion, the products are diluted and the flask assembled to the stillhead. Alkaline reagents are added through the funnel, the air inlet tube inserted and the flask heated while air is bubbled through its contents. The ammonia and water vapour are led through the splash head and condenser into a receiver flask. To terminate the test the heat source and air inlet tube are removed.

The apparatus is mounted on a 45 cm retort stand using plastics covered spring clips.

NR-660

DISTILLATION APPARATUS, non-transference micro-Kjeldahl. (AG) borosilicate glass, to BS 1428 Part B3 and as specification ... ... Each **£14·00** *b*

REPLACEMENT PARTS

NR-662	**Digestion flask,** with 19/26 socket ...	Each	**£0·90**	*a*
NR-663	**Stillhead,** with 19/26 cone and 10/19 socket.	Each	**£3·00**	*a*
NR-664	**Inlet tube,** with 10/19 cone	Each	**£0·40**	*a*
NR-665	**Condenser tube,** borosilicate glass ...	Each	**£0·30**	*a*

The condenser jacket, condenser funnel and **receiver flasks** are identical to those for NR-650. For prices and details see entries above.

ACCESSORY

AF-400	**Air pump** suitable for use with NR-660. For price and details see entry in List No. sequence.

NOTES. Condenser tubes NR-655 and NR-665 are interchangeable and thus provide a choice of silver or glass on either distillation assembly.

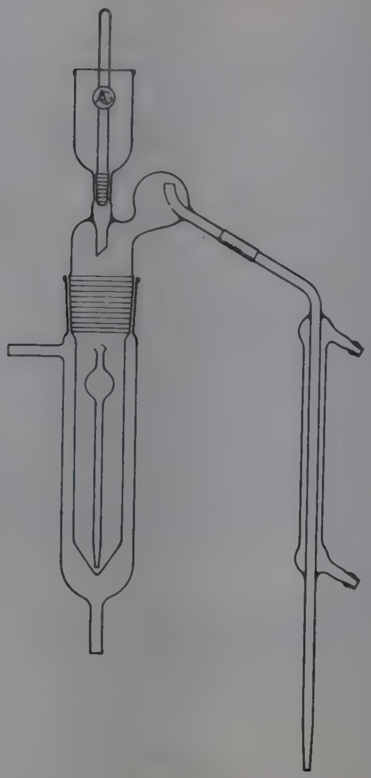
Apparatus NR-660 can be used with a steam generator as NR-658 if desired, instead of using an air supply, but this procedure does not comply with BS 1428 Part B3.

NR-680

DISTILLATION APPARATUS, ultra-micro-Kjeldahl, (AG) Markham pattern, borosilicate glass. Designed for use in biochemical work on quantities of distillate up to 2 ml. One piece assembly with 7/11 stopper. Each **£5·70** *a*

MARKHAM apparatus for micro-Kjeldahl determination see **QUICKFIT APPARATUS.**

All items on this page normally available from stock.



NR-690

(AG) MICRO-KJELDAHL DISTILLATION APPARATUS

†HOSKINS MICRO-KJELDAHL DISTILLATION APPARATUS

For convenient and precise distillations with 40 or 80 ml samples. The apparatus incorporates a steam condensation-suction device for the automatic removal of the sample thereby enabling successive determinations to be made very rapidly.

The apparatus comprises an outer tube with 50/42 socket, steam entry sidearm and drain tube: two alternative inner tubes with 50/42 cone, splash head, funnel with 10/19 socket for peg stopper and a narrow jacket condenser.

†Reference. Hoskins, Analyst **69**, 1944, 271.

NR-690

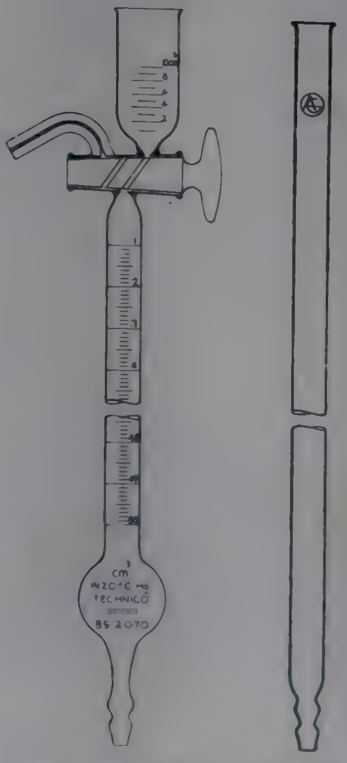
MICRO-KJELDAHL DISTILLATION APPARATUS, Hoskins, (AG), all borosilicate glass, as specification **with 80 ml inner tube** ... ... Each **£7·00** *a*

NR-691

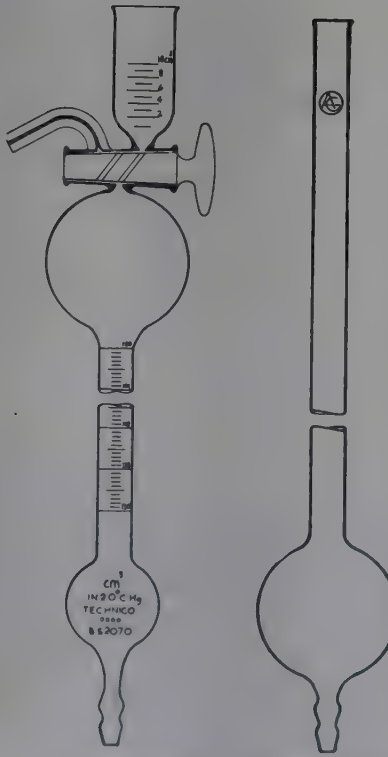
MICRO-KJELDAHL DISTILLATION APPARATUS, Hoskins, (AG), as above but **with 40 ml inner tube.** Each **£6·70** *a*

COMPONENTS

NR-692	**Inner tube, 80 ml,** with splash head and funnel, on 50/42 cone	Each	**£4·20**	*a*
NR-693	**Inner tube, 40 ml,** with splash head and funnel, on 50/42 cone	Each	**£3·90**	*a*
NR-704	**Outer vessel,** with 50/42 socket ...	Each	**£1·65**	*a*
NR-705	**Condenser**	Each	**£0·85**	*a*
NR-709	**Peg stopper,** cone 10/19 for funnel ...	Each	**£0·35**	*a*



NT-040



NT-060

NITROMETERS

NT-040

NITROMETER, Lunge†, borosilicate glass, to BS 2070. Comprises measuring tube graduated 1 to 50 cm³ in 0·1 cm³, with a double oblique bore stopcock and 10 cm³ cup graduated in 2 cm³. With plain levelling tube. Set **£3·90** *a*

†Lunge and Ambler 'Technical Gas Analysis', p. 371.

NT-060

NITROMETER, Lunge, borosilicate glass, to BS 2070, particularly suitable for nitrocellulose and nitroglycerine determinations. Comprises measuring tube graduated from 100 to 130 cm³ in 0·1 cm³ with a 100 cm³ bulb surmounted by a double oblique bore stopcock and a 10 cm³ cup graduated in 2 cm³. With plain levelling tube. Set **£4·70** *a*

All items on this page normally available from stock.

Gallenkamp CALIBRATING OIL BATHS

MAXIMUM TEMPERATURE 200°C

For comparisons of Thermometers, Thermocouples and other similar applications.

- **Manually controlled model for steadily changing temperature**
- **Thermostatically controlled model for constant or changing temperatures**
- **Temperature variation ±0·25degC**

OPERATION

The bath is heated by a double, tubular immersion heater rated at 250 and 1250W, of which the latter portion is used solely as a boost heater. The heating and cooling rates for the manually controlled model are:—

Temperature of bath	50°C	200°C
Heating rate (250W heater)	1degC/min	0·4degC/min
Cooling rate	0·05degC/min	0·5degC/min

Time to heat from 20° to 200°C (with boost heater) 40 min.

When the bath is stirred, temperature variation over 20 cm diameter and 23 cm depth is only ±0·25degC.

If it is necessary to adjust the heating and cooling rates a variable transformer ED-601 may be incorporated into the 250W heater circuit.

Thermostatically Controlled Model. For making comparisons at constant temperatures in addition to the steadily rising or falling temperatures obtained with the standard apparatus. The modified bath is fitted with an adjustable contact thermometer, an electronic relay and a stirrer. Temperature fluctuation is within 0·2degC.

DESIGN

The bath is a welded cylindrical tank which is of cadmium plated steel. There is glass wool insulation and a heat break between the tank and the casing and a removable top cover is fitted. The support rod at the back of the casing is for mounting a stirrer motor.

A 3-pin socket and plug for connecting the stirrer motor are fitted and the bath is supplied with a mains connecting cable.

DIMENSIONS

Inner tank	30 cm deep, 20 cm dia.
Outer casing	35×28×28 cm
Capacity	9 litres

OD-050

OIL BATH, calibrating, *Gallenkamp*, as specification, **manually controlled.** With plain removable cover but **without stirrer.** For a.c. single phase supplies.

For 220/240V	Each	**£64·00**	*b*
For 200/210V	Each	**£66·00**	*bN*
For 110/120V	Each	**£66·00**	*bN*

OD-051

OIL BATH, calibrating, *Gallenkamp*, as OD-050 but **thermostatically controlled.** Fitted with stirrer assembly, contact thermometer range 0–200°C and electronic relay. For a.c. single phase supplies.

For 220/240V	Each	**£140·00**	*b*
For 200/210V	Each	**£142·00**	*bN*
For 110/120V	Each	**£142·00**	*bN*

When ordering please state voltage and frequency of supply.

OD-050 with SS-425 and SS-548

REPLACEMENT PARTS AND ACCESSORIES

OD-052	**Immersion heater**	Each	£9·00	*b*
*OD-054	**Contact thermometer,** for OD-051, range 0 to 200°C.	Each	£9·00	c
ED-601	**Transformer,** *Variac*, enclosed type for 240V a.c.			
OD-150	**Oil,** for filling bath.			
SM-610	**Bosshead,** *Technico.*			
SS-425	**Stirrer, Handilab.**			
SS-455	**Chuck,** for fitting SS-548 to stirrer SS-425.			
SS-548	**Flexible stirring rotor,** with 46 cm stainless steel shaft.			

For details and prices of the above see entries in List No. sequence.

When ordering replacement parts please state serial number of bath and supply voltage.

Items on this page normally available from stock except those coded *N*.

Gallenkamp THERMOSTATIC OIL BATHS

MAXIMUM TEMPERATURE 200°C

For a wide range of applications such as oxidation stability tests on oils and greases and as a heating source in extractions and distillations and any work requiring close temperature control.

- **Two sizes available—capacities 27 and 60 litres**
- **Temperature fluctuation within 0·5degC**

OD-110

DESIGN

The baths are strongly constructed in steel throughout with a rectangular welded inner tank with a durable black matt finish. The large area floor is strong enough to support heavy objects.

DIMENSIONS

Size	1	2	
Overall, excluding control box	50 × 42 × 29	65 × 48 × 39	cm
Internal	39 × 30 × 23	55 × 38 × 30	cm
Working space	28 × 30 × 20	43 × 38 × 28	cm
Capacity	27	60	litres
Maximum power rating	2	3·5	kW

OPERATION

All controls are mounted in the control box which bridges one end of the bath, leaving a maximum of space free from obstruction.
Each bath is heated by two independently switched tubular immersion heaters rated according to the size of the bath.
One heater in each bath is used as a boost heater.
The thermostat, which is mounted in the control box, operates in conjunction with a hotwire relay. A powerful shaded pole motor, also fitted into the control box, drives a stirring rotor attached to a flexible stainless steel shaft.

Heating rates

Size 1 20° to 200°C in 80 min
Size 2 20° to 200°C in 110 min
(no overshoot occurs with either size).

Temperature variation

Both sizes within ±0·5degC throughout the working space.

Temperature fluctuation

Both sizes within 0·5degC.

OD-110

OIL BATHS, thermostatic, *Gallenkamp*, electrically heated, as specification. For a.c. single phase supplies.

Size		1	2	
For 220/240V	Each	**£104·00**	**£121·00**	*b*
For 200/210V	Each	**£108·00**	**£125·00**	*bN*
For 110/120V	Each	**£108·00**	**£125·00**	*bN*

When ordering please state voltage and frequency of supply

REPLACEMENT PARTS

OD-120	**Immersion heater, 1000W for size 1.**	Each	**£4·60**	*b*
OD-121	**Immersion heater, 1500W for size 2.**	Each	**£4·70**	*b*
OD-122	**Boost heater, 1000W for size 1** ...	Each	**£4·70**	*b*
OD-123	**Boost heater, 2000W for size 2** ...	Each	**£6·00**	*b*
OD-124	**Stirrer motor, for both sizes**	Each	**£6·60**	c

When ordering replacement parts please state serial number of bath and supply voltage.

ACCESSORIES

OD-150	**Oil,** opaque, with viscosity characteristics suitable for use in above oil baths, between 50 and 200°C. Flash point 232°C. In 5 gallon (22·5 litres) non-returnable drum.	Each	**£6·20**	c
AU-447	**Stopcock,** polythene, suitable for above oil drum ...	For details and prices see entries in List No. sequence.		
LX-110	**Lubricant,** suitable for motor bearings			

Items on this page normally available from stock except those coded *N*.

Gallenkamp LABORATORY AND INDUSTRIAL OVENS

SECTION INDEX

List No.	Description	Internal dimensions cm H × W × D	Maximum temperature °C	Page
OV-010	Hotbox Oven/Sterilisers	33 × 48 × 33 48 × 48 × 43	200	538
OV-060	Economy Oven	28 × 38 × 30	200	539
OV-062	,, ,, (glass door)	,, ,, ,,	160	539
OV-160/165	BS Ovens	46 × 40 × 36 61 × 51 × 46 76 × 61 × 46	250	540/2
OV-330/335	BS Ovens	46 × 40 × 36 61 × 51 × 46	300	543/4
OV-420/425	BS Oven/Sterilisers	76 × 61 × 46	250	545
OV-440/445	Moisture Extraction Ovens	76 × 61 × 46	250	546
OV-620	Humidity Oven	68 × 61 × 46	60	548/9
OV-700	Humidity Oven	71 × 81 × 68·5	100	550/4
OV-880	Drying Cabinet	72 × 64 × 37	120	555
OV-930	Vacuum Ovens	Dia. × Depth 30·5 × 32·5 37 × 50	150	556

Incubator and Oven Stands see OV-480 to OV-484

Embedding Oven see HJ-100

For details and prices of the above see entries in List No. sequence.

Paint Corrosion Oven see PB-210

Vacuum Drying Oven see MV-600

DEFINITIONS OF TERMS

The following terms, defined in BS specifications, are used in the tabulated performance data given for *Gallenkamp* ovens: All other terms used are considered to be self-explanatory.

Working space—That portion of the internal space which is above the lowest shelf and not less than 3 cm from any wall (including the roof).

Oven temperature—The temperature at the centre of the working space.

Temperature variation—The difference at any moment between the temperature at the centre of the working space and at any other point in the working space.

Temperature fluctuation—The short term changes in temperature (due to operation of the temperature controller) at any point in the working space.

Recovery—The time taken for an oven to regain temperature within 1degC after the temperature has been reduced from an initial steady state by opening the door fully for one minute.

Recovery overshoot—Any temperature overshoot induced by the procedure described under 'Recovery'.

NOTE 1: The factor most likely to influence the choice of oven is the size since it is always advisable to have ample capacity for the work in hand. Undue congestion of oven working space invariably leads to loss of performance.

NOTE 2: Maximum power rating—see explanation on page 542.

Gallenkamp HOTBOX OVEN/STERILISERS, 200°C

Gallenkamp
Hotbox

OV-010 Size 2

PERFORMANCE

For definitions of terms see page 537.

Size No.	1	2	
Temperature fluctuation	2	2	degC
Time to heat to 200°C	30	30	min
Power rating max.	500	750	W

DIMENSIONS

	H W D	H W D	
Internal	33 × 48 × 33	47 × 48 × 43	cm
	13 × 19 × 13	18½ × 19 × 17	in
Overall	56 × 59 × 48	70 × 58 × 58	cm
	22 × 23 × 19	27½ × 23 × 23	in
Weight, net	23	25	kg
	50	54	lb
Shelves			
Number supplied	2	3	
Number of positions	4	6	
Dimensions	48 × 30	48 × 40	cm
	19 × 11½	19 × 16	in

Economically priced, wide shelved ovens for general laboratory use including drying and sterilising.

- **Control by direct reading thermostat**
- **Gravity convection**
- **Welded steel exterior**
- **Aluminium interior—large shelf areas**
- **Both sizes accommodate pipette sterilising boxes SR-800**

DESIGN

Each oven has a welded steel exterior and a polished aluminium liner with fixed shelf positions. Temperature control is by a direct reading thermostat and a load indicator lamp is fitted.

The internal dimensions have been selected to provide extra wide shelves so that long pieces of glassware, such as pipettes, can be accommodated.

OV-010

OVEN/STERILISERS, HOTBOX, *Gallenkamp*, 200°C, as specification, with hydraulic thermostat, load indicator lamp, shelves and sheathed heater. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£56·00**	**70·00**	*b*
For 200/210V	Each	**£57·00**	**71·00**	*bN*
For 110/120V	Each	**£57·00**	**71·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-012 **Heating element.**

Size No.	1	2	
Each	£2·20	2·50	*b*

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

ACCESSORIES

OV-014 **Extra shelf.**

Size No.	1	2	
Each	£1·50	1·70	*b*

LB-150	**Labels, 'STERILE'**	For details and prices see entries in List No. sequence.
SR-800	**Sterilising boxes**	
TJ-050	**Thermometer,** scale span 0 to 250°C	
TJ-170	**Thermometers,** scale span 50 to 110°C and 150 to 210°C	

For suitable **FLOOR STAND** see **OV-482** in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp ECONOMY OVENS, 200°C
WITH *Compenstat* CONTROL

For general work requiring stability over long periods, these ovens combine the reliable performance of the *Compenstat* with a simplicity of design and economy of price.

- ***Compenstat* direct reading thermostat**
- **Wide shelves**
- **Adjustable ventilator**
- **Insulated metal or toughened glass doors**

DESIGN

The light-grey enamelled steel exterior encloses an efficiently lagged aluminium interior with fixed shelf runners. The shelves are perforated aluminium sheets, flanged front and rear. A metal sheathed heater is fitted outside the bottom of the oven liner. Controls comprise the *Compenstat*, scaled 30 to 200°C, the load indicator lamp and the mains ON/OFF switch.

Two alternative doors are offered—an insulated metal door with resilient gasket or a glass door with sprung phosphor bronze sealing strip. **The oven with glass door has a maximum working temperature of 160°C.** Both doors have fitted nameplates with pockets for test record cards.

PERFORMANCE

For definitions of terms see page 537.

Temperature fluctuation less than 1degC at all temperatures

Time to heat to 200°C	45 min
Power rating max.	650 W

DIMENSIONS

	H	W	D
Internal	28 ×	38 ×	30 cm
	11 ×	15 ×	12 in
Overall	53 ×	51 ×	43 cm
	21 ×	20 ×	17 in

Weight, net	24 kg 52 lb
Shelves	
Number supplied	2
Number of positions	4
Dimensions	35·5×29 cm 14 ×11½ in

For suitable **FLOOR STAND** see **OV-480** in List No. sequence.

Gallenkamp

OV-060

OV-060

OVEN, ECONOMY, *Gallenkamp*, 200°C, as specification **with metal door,** *Compenstat* direct reading thermostat, load indicator lamp, mains switch, shelves, sheathed heater and adjustable ventilator. For single phase a.c. supplies.

For 220/240V	Each	**£68·00**	*b*
For 200/210V	Each	**£69·00**	*bN*
For 110/120V	Each	**£69·00**	*bN*

OV-062

OVEN, ECONOMY, *Gallenkamp*, 160°C, as specification and OV-060 **but with toughened glass door.** For single phase a.c. supplies.

For 220/240V	Each	**£69·00**	*b*
For 200/210V	Each	**£70·00**	*bN*
For 110/120V	Each	**£70·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-066	**Heater,** 650W	Each	**£4·25**	*b*

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

ACCESSORIES

OV-068	**Shelf**	Each	**£1·65**	*b*
TJ-050	**Thermometer,** scale span 0 to 250°C in 1degC. For full details and price see entry in List No. sequence.			

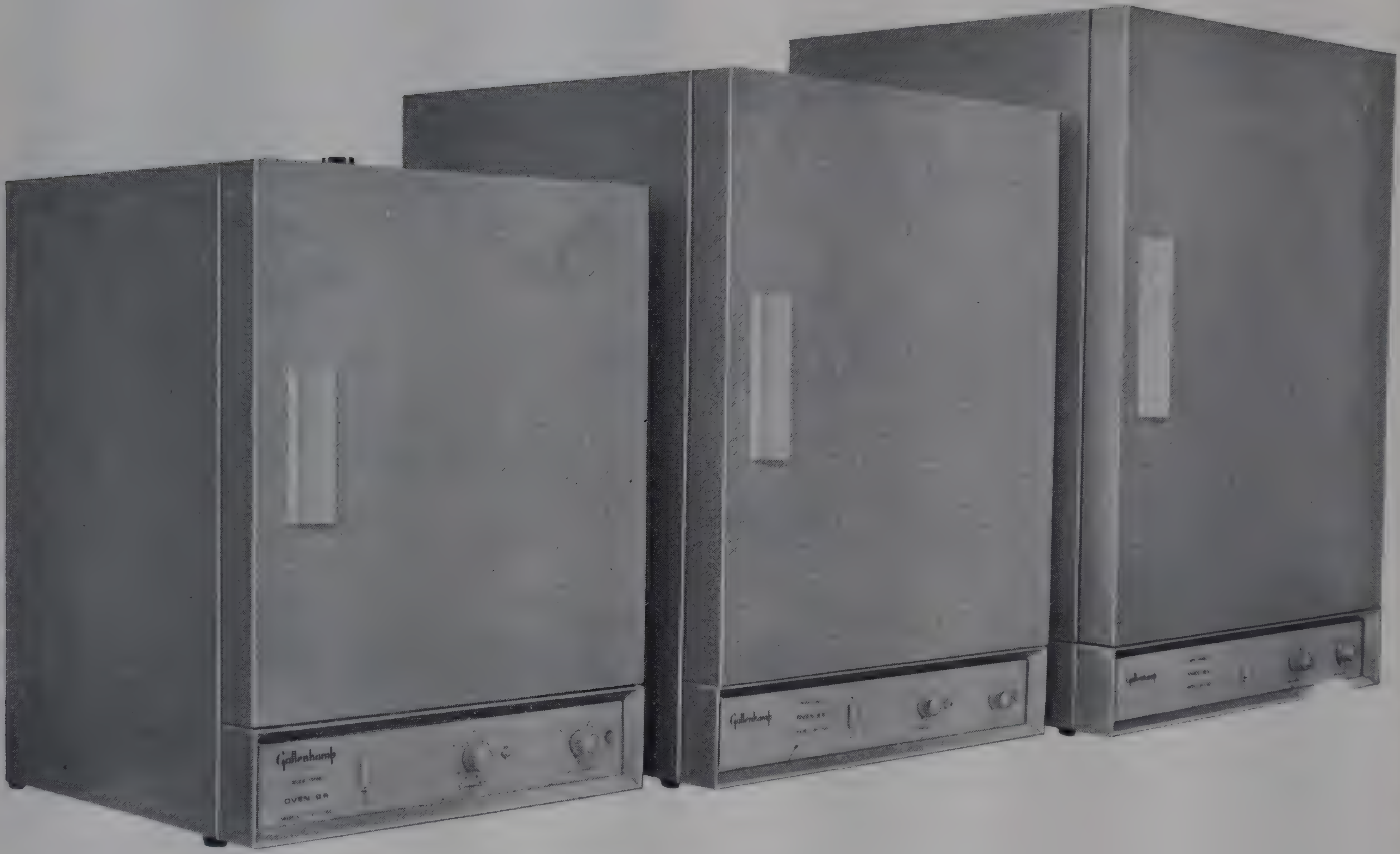
Items on this page normally available from stock except those coded *N*.

Gallenkamp BS OVENS, 250°C

TO BS 2648 and BS 3421

WITH Compenstat (SOLID STATE) CONTROL

Modern heating, drying and sterilising ovens, scientifically designed to conform to the performance requirements of BS 2648 for electrically heated laboratory ovens and BS 3421 for electrically heated sterilising ovens.



- Accurate temperature control by direct reading Compenstat (solid state)
- Safety thermostat for additional protection
- Available in three sizes up to 210 litres (7·5 ft³) capacity
- Fan convection ensures temperature uniformity even at full load
- Unitised controls simplify maintenance and servicing
- Efficient insulation for operating economy
- Recessed panel protects controls from inadvertent alteration
- Stainless steel interior designed for easy cleaning

Gallenkamp BS OVENS

REGD TRADE MARK

(continued)

DESIGN

Exterior. The exterior of the oven is easily cleaned and is finished in a hard light-grey stoved enamel. The door gasket is of woven fibre and the door is provided with a plugged hole for fitting a dial thermometer. The adjustable door catch enables the door to be opened and closed exceptionally easily but, being spring-loaded, holds the door firmly when shut.

Interior. The oven liner is of corrosion resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and an easily removable baffle at the rear which guards the fan and heaters. There are no electrical connections within the working space.

Shelves. The 12·5 mm grid steel wire shelves are heavily plated with chromium on nickel in accordance with BS 1224 Grade 1S.

Basket shelves with grid sides 7 cm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the oven with minimum heat loss.

Heating and Air Circulation. Air drawn from the centre of the oven is recirculated to the top and bottom of the workspace by a rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is shielded from the workspace by the baffle. The fan motor has bearings which require no lubricating.

Temperature control. Temperature is accurately and reliably controlled by a *Compenstat* (solid state) which is direct reading over the temperature range of the oven. In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the *Compenstat*, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Ventilation. An adjustable ventilator in the top of the oven may be closed to prevent airflow or opened to allow air drawn in by the fan to flow through the oven for fume or moisture extraction. The ventilator incorporates a clip to hold a mercury in glass thermometer and may be lifted out to provide a 2·8 cm dia. aperture for cables, tubing, etc. Since there is no air inlet in the base of the oven, the controls and circuits are completely protected from spillage.

PERFORMANCE

Data when tested to British Standard 2648 'Performance requirements for electrically heated laboratory ovens (unloaded)'.

For definitions of terms see page 537.

Size No.	**1**	**2**	**3**
At 100°C			
Temperature fluctuation	0·1	0·1	0·1degC
Temperature variation	1·0	1·5	2·0degC
Heating time to stability	35	45	50 min
Recovery	6	8	7 min
Recovery overshoot	1·0	0	0degC
Ventilation rate	2000	2000	2000 l/hr
At 250°C			
Temperature fluctuation	0·1	0·1	0·1degC
Temperature variation	2·5	4·0	6·0degC
Heating time to stability	50	60	60 min
Recovery	20	20	20 min
Recovery overshoot	0	0	0degC

Data when tested to British Standard 3421 'Performance of electrically heated sterilising ovens (loaded) at ambient plus 140°C'.

Size No.	**1**	**2**
Temperature drift during 2 hr period	0	0·5degC
Temperature variation	3·0	4·0degC
Heating time to stability	135	120 min
Overshoot	0	0degC

(**Note:** Oven Size No. 3 does not conform with BS 3421. For large capacity oven/sterilizer see OV-420).

DIMENSIONS

Size No.	**1**	**2**	**3**	
	H W D	H W D	H W D	
Internal	46×40×36	61×51×46	76×61×46	cm
	18×16×14	24×20×18	30×24×18	in
Overall	81×58×71	96×68×81	112×79×79	cm
	32×23×28	38×27×32	44×31×31	in
Shelves				
Size (net usable)	38×34	48×44	58×44	cm
	15×13½	19×17½	23×17½	in
Number supplied	3	3	4	
Number of positions	4	5	6	
Interval between positions	11	11·5	12	cm
	4¼	4½	4¾	in
Basket shelves				
Size, internal	33×33×7	43×43×7	53×43×7	cm
	13×13×2¾	17×17×2¾	21×17×2¾	in
Weight, net	56	78	94	kg
	122	172	206	lb
Power rating, max.	1·0	1·5	2·0	kW

Gallenkamp BS OVENS

(continued)

OV-160

OVENS, BS, *Gallenkamp*, **fan convection, 250°C,** as specification, to BS 2648 (and BS 3421 size Nos. 1 and 2 only). With *Compenstat* (solid state) direct reading temperature controller and independent safety thermostat. Fitted with load indicator and safety thermostat takeover indicator lamps. **Without thermometer.** For single phase supplies.

Size No.	1	2	3	
For 220/240V 50 Hz	**£138·00**	**158·00**	**187·50**	*b*
For 200/210V 50 Hz	**£139·00**	**165·00**	**188·00**	*bN*
For 110/120V 60 Hz	**£139·00**	**165·00**	**188·00**	*bN*

OV-165

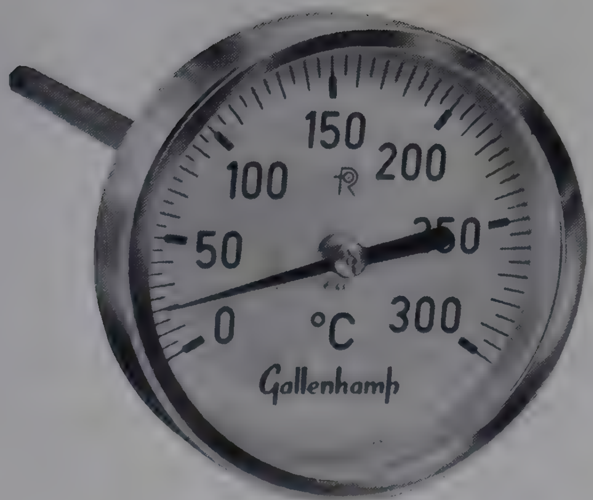
OVENS, BS, *Gallenkamp*, as OV-160 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

Size No.	1	2	3	
For 220/240V 50 Hz	**£162·00**	**182·00**	**203·50**	*b*
For 200/210V 50 Hz	**£163·00**	**188·00**	**210·00**	*bN*
For 110/120V 60 Hz	**£163·00**	**188·00**	**210·00**	*bN*

When ordering please state voltage and frequency of supply.

For suitable **FLOOR STANDS** see **OV-480** to **OV-484** in List No. sequence.

OV-176



OV-178

REPLACEMENT PARTS

OV-170 **Heaters.**

Oven Size No.	1	2	3	
Each	**£3·70**	**3·70**	**3·70**	*b*

OV-172 **Motor, fan** ... ... Each **£7·00** *c*

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

OV-174 **Shelves.**

Oven Size No.	1	2	3	
Each	**£1·60**	**1·80**	**2·20**	*b*

ACCESSORIES

OV-176 **Basket shelves.**

Oven Size No.	1	2	3	
Each	**£3·90**	**4·70**	**5·40**	*b*

***OV-178** **Dial temperature indicator, door fitting pattern,** with retaining clip. Range 0–300°C ... Each **£7·00** *c*

TJ-060 **Thermometer,** range 0 to 250°C, to fit ventilator clip, for general applications ... ...

TJ-170 **Thermometer,** range as selected, to fit ventilator clip, for applications requiring an accurate indication of temperature ... ...

For details and prices see entries in List No. sequence.

NOTE: Throughout this publication **maximum power rating** is included in the tabulated data. This is the maximum power that the apparatus will require for any combination of settings of its controls. The electricity supply outlet to which the apparatus is connected must have sufficient current carrying capacity to supply this power otherwise the mains installation may be damaged. Over a period of time the **actual power consumption** of an apparatus incorporating controls for temperature, motor speed, etc., will be normally very much less than the maximum rating. Values cannot be quoted for actual power consumption because they depend for example on the working temperature, ambient conditions and the manner of use of the apparatus.

Gallenkamp BS OVENS, 300°C

With *Compenstat* (solid state) control and push-button preset temperature selection.

- ***Compenstat*** **(solid state) temperature control—direct reading**
- **Safety thermostat for additional protection**
- **Conform to the performance requirements of BS 2648 and BS 3421**
- **Fan convection ensures temperature uniformity even at full load**
- **Extra thick insulation for cool exteriors and operating economy**
- **Printed circuit simplifies maintenance**
- **Stainless steel interior designed for easy cleaning**

Gallenkamp
SIZE ONE
OVEN BS
Compenstat

OV-330

DESIGN

Exterior. The exterior of the oven is easily cleaned and is finished in a hard light-grey stoved enamel. The door gasket is of woven fibre and the door is provided with a plugged hole for fitting a dial thermometer. The adjustable door catch enables the door to be opened and closed exceptionally easily but, being spring-loaded, holds the door firmly when shut.

Interior. The oven liner is of corrosion resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and an easily removable baffle at the rear which guards the fan and heaters. There are no electrical connections within the working space.

Heating and Air Circulation. Air drawn from the centre of the oven is recirculated to the top and bottom of the workspace by a rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is shielded from the workspace by the baffle. The fan motor has bearings which require no lubricating.

Ventilation. An adjustable ventilator in the top of the oven may be closed to prevent airflow or opened to allow air drawn in by the fan to flow through the oven for fume or moisture extraction. The ventilator incorporates a clip to hold a mercury in glass thermometer and may be lifted out to provide a 2·8 cm dia. aperture for cables, tubing, etc. Since there is no air inlet in the base of the oven, the controls and circuits are completely protected from spillage.

Shelves. The 12·5 mm grid steel wire shelves are heavily plated with chromium on nickel in accordance with BS 1224 Grade 1S.

Basket shelves with grid sides 7 cm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the oven with minimum heat loss.

For additional information see overleaf.

Gallenkamp BS OVENS, 300°C

(continued)

Temperature Control. Temperature is accurately and reliably controlled by a *Gallenkamp* direct reading *Compenstat* (solid state). This has two continuously variable direct reading temperature scales ranged 40–180°C and 170–300°C. It also has three pre-set controls, two of which are in the range 60–170°C and the third 170–280°C, which can be pre-set by the user to temperatures most commonly required. The range controls and the pre-set controls are selected by push-buttons on the control panel. For additional security of oven contents, a safety thermostat is fitted which, in the event of incorrect setting or failure of the electronic controller, takes over and maintains the oven at a higher temperature (with a larger temperature differential). Under these circumstances a warning lamp indicates that the safety thermostat has taken over control.

PERFORMANCE

For definitions of terms see page 537.

Size No.	**1**	**2**
At 200°C		
Temperature fluctuation	0·1	0·1degC
Temperature variation	2·0	4·0degC
Heating time to stability	45	60 min
Recovery	6	8 min
Recovery overshoot	1·0	0degC
Ventilation rate	2000	2000 l/hr
At 300°C		
Temperature fluctuation	0·1	0·1degC
Temperature variation	4·0	7·0degC
Heating time to stability	60	75 min
Recovery	20	20 min
Recovery overshoot	0	0degC

DIMENSIONS

Size No.	**1**	**2**	
	H W D	H W D	
Internal	46×40×35	61×51×46	cm
	18×16×14	24×20×18	in
Overall	81×58×71	96×68×81	cm
	32×23×28	38×27×32	in
Shelves			
Size (net usable)	38×34	48×44	cm
	15×13½	19×17½	in
Number supplied	3	3	
Number of positions	4	5	
Interval between positions	11	11·5	cm
	4¼	4½	in
Basket shelves			
Size, internal	33×33×7	43×43×7	cm
	13×13×2¾	17×17×2¾	in
Weight, net	57	79	kg
	124	174	lb
Power rating, max.	1·5	2·0	kW

OV-330

OVENS, BS, *Gallenkamp*, **fan convection, 300°C,** as specification, to BS 2648 and BS 3421. With direct reading *Compenstat* (solid state) and independent safety thermostat. Fitted with load indicator and safety thermostat takeover indicator lamps. For single phase supplies.

Size No.	1	2	
For 220/240V 50 Hz	**£168·00**	**188·00**	*b*
For 200/210V 50 Hz	**£183·00**	**203·00**	*bN*
For 110/120V 60 Hz	**£183·00**	**203·00**	*bN*

OV-335

OVENS, BS, *Gallenkamp*, as OV-330 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

Size No.	1	2	
For 220/240V 50 Hz	**£192·00**	**212·00**	*b*
For 200/210V 50 Hz	**£204·00**	**224·00**	*bN*
For 110/120V 60 Hz	**£204·00**	**224·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

OV-340 **Heaters.**

Oven Size No.	1	2	
Each	**£3·60**	**3·60**	*b*

OV-172	**Motor**	For prices see entries in List No. sequence.
OV-174	**Shelves**	

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

ACCESSORIES

OV-176	**Basket shelves**	For details and prices see entries in List No. sequence.
OV-178	**Dial temperature indicator, door** fitting, range 0–300°C	
TJ-060	**Thermometer,** range 0 to 360°C, to fit ventilator clip	
TJ-170	**Thermometers,** ranges up to 260°C as selected, to fit ventilator clip ...	
TJ-264	**Thermometer,** range 245 to 305°C, to fit ventilator clip	

For suitable **FLOOR STANDS** see **OV-480** and **OV-482** in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp OVEN/STERILIZER, 250°C

LARGE CAPACITY

WITH Compenstat (SOLID STATE) CONTROL

A large capacity modern sterilising oven scientifically designed to conform to the performance requirements of BS 3421 'Performance of Electrically Heated Sterilising Ovens'.

- **Accurate temperature control by direct reading *Compenstat* (solid state)**
- **Safety thermostat for additional protection**
- **Capacity 210 litres (7·5 ft^3)**
- **Fan convection ensures temperature uniformity even at full load**
- **Stainless steel interior designed for easy cleaning**

DESIGN

The interior of the oven is of corrosion resistant EN 58B stainless steel, with 6 fixed shelf runners to accept both the 12·5 mm grid nickel chromium plated steel wire shelves and OV-176 Size No. 3 basket shelves. Interval between shelf positions is approximately 12 cm. The door is fitted with a woven fibre gasket, an adjustable light-action door catch and a plugged hole to accept a dial thermometer.

OPERATION

Temperature control. Temperature is accurately and reliably controlled by a *Compenstat* (solid state) which is direct reading over the temperature range of the oven. In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the *Compenstat*, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Air circulation and ventilation

A removable rear baffle provides ducted re-circulation of the air drawn in at the centre by the fan. The fan motor has bearings which do not require lubricating.

An adjustable ventilator at the top of the oven regulates the passage of room air through the working space. The ventilator incorporates a thermometer clip and it may be lifted out to provide an aperture for tubing, wires, etc. There is no air inlet in the base of the oven and the controls are therefore fully protected from spillage.

PERFORMANCE when tested to BS 3421 methods at ambient plus 140degC. **For definitions of terms see p. 537.**

Temperature drift during 2 hr period	0·5degC
Temperature variation	5degC
Heating time to stability	120 min
Overshoot on initial heating	0degC

DIMENSIONS

	H W D	
Internal	76×61×46 30×24×18	cm in
Overall	112×79×81 44×31×32	cm in
Shelves Size (net usable)	58×44 23×17½	cm in
Weight, net	102 kg	
Power rating, max.	2·5 kW	

OV-420

OV-420

OVEN/STERILIZER, large capacity, *Gallenkamp*, **fan convection, 250°C,** as specification, to BS 3421. With *Compenstat* (solid state) direct reading temperature controller and safety thermostat. Fitted with load indicator lamp, safety thermostat indicator lamp and 4 shelves. **Without thermometer.** For single phase supplies.

For 220/240V 50 Hz	... ...	Each	**£181·50** *b*
For 200/210V 50 Hz	... ...	Each	**£188·50** *bN*
For 110/120V 60 Hz	... ...	Each	**£188·50** *bN*

OV-425

OVEN/STERILIZER, large capacity, *Gallenkamp*, as OV-420 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

For 220/240V 50 Hz	... ...	Each	**£204·00** *b*
For 200/210V 50 Hz	... ...	Each	**£211·00** *bN*
For 110/120V 60 Hz	... ...	Each	**£211·00** *bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS AND ACCESSORIES

OV-430	**Heater**	Each **£3·25** *b*
OV-172	**Fan motor**	For full details and prices see entries in List No. sequence.
OV-174	**Shelves,** Size No. 3	
OV-176	**Basket shelves,** Size No. 3 ...	
OV-178	**Dial thermometer**	
OV-484	**Floor stand**	

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

Gallenkamp MOISTURE EXTRACTION OVEN, 250°C

LARGE CAPACITY

WITH Compenstat (SOLID STATE) CONTROL

A large capacity modern oven designed for the rapid, even drying of wet bulk laboratory and industrial samples such as sand, vegetable matter, tobacco, wood pulp, paper, etc.

- **Accurate temperature control by direct reading *Compenstat* (solid state)**
- **Safety thermostat for additional protection**
- **Capacity 210 litres (7·5 ft³)**
- **Forced ventilation and large heater for rapid moisture extraction**
- **Liner of corrosion resistant stainless steel to BS 971, EN 58B**

OV-440

DESIGN

The interior of the oven is of corrosion resistant EN 58B stainless steel, with 6 fixed shelf runners to accept both the 12·5 mm grid nickel chromium plated steel wire shelves and OV-176 Size No. 3 basket shelves. Interval between shelf positions is approximately 12 cm. The door is fitted with a woven fibre gasket, an adjustable light-action door catch and a plugged hole to accept a dial thermometer.

OPERATION

Temperature control. Temperature is accurately and reliably controlled by a *Compenstat* (solid state) which is direct reading over the temperature range of the oven. In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the *Compenstat*, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Air circulation and ventilation. A removable rear baffle provides ducted re-circulation of the air drawn in at the centre by the fan. The fan motor has bearings which require no lubrication.

The combination of the high powered heater and the mechanical ventilation system provides a rapid throughput of heated air. Provision is made for connecting the air outlet on the top of the oven to the duct of a moisture extraction system. An outlet adapter for 4 in (10 cm) internal diameter ducting is supplied.

PERFORMANCE—unloaded oven at 110°C.
For definitions of terms see p. 537.

Temperature fluctuation	1·0degC
Temperature variation	2·0degC
Heating time to stability	25 min
Maximum ventilation rate	36,000 l/hr

DIMENSIONS

	H W D	
Internal	76×61×46	cm
	30×24×18	in
Overall	112×79×81	cm
	44×31×32	in
Shelves		
Size (net usable)	58×44	cm
	23×17½	in
Weight, net	94	kg
Power rating, max.	2·75	kW

OV-440

OVEN, MOISTURE EXTRACTION, large capacity, ***Gallenkamp*****, fan convection and ventilation, 250°C,** as specification. With *Compenstat* (solid state) direct reading temperature controller, safety thermostat, outlet adapter and 4 shelves. Fitted with load indicator and safety thermostat takeover indicator lamps **Without thermometer.** For single phase supplies.

For 220/240V 50 Hz	Each	**£203·50**	*b*
For 200/210V 50 Hz	Each	**£210·00**	*bN*
For 110/120V 60 Hz	Each	**£210·00**	*bN*

OV-445

OVEN, MOISTURE EXTRACTION, large capacity, *Gallenkamp*, as OV-440 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

For 220/240V 50 Hz	Each	**£224·00**	*b*
For 200/210V 50 Hz	Each	**£236·00**	*bN*
For 110/120V 60 Hz	Each	**£236·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS AND ACCESSORIES

OV-448	**Heater**	Each £4·10 *b*
OV-172	**Fan motor**	For full details and prices see entries in List No. sequence.
OV-174	**Shelves,** Size No. 3	
OV-176	**Basket shelves,** Size No. 3 ...	
OV-178	**Dial thermometer**	
OV-482	**Floor stand**	

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

Gallenkamp OVEN AND INCUBATOR STANDS

A range of rigid steel floor stands designed to provide a comfortable working height for *Gallenkamp* ovens and incubators. With fixed support platform and convenient undershelf for samples, etc.

Supplied in pre-pack with instructions for assembly.

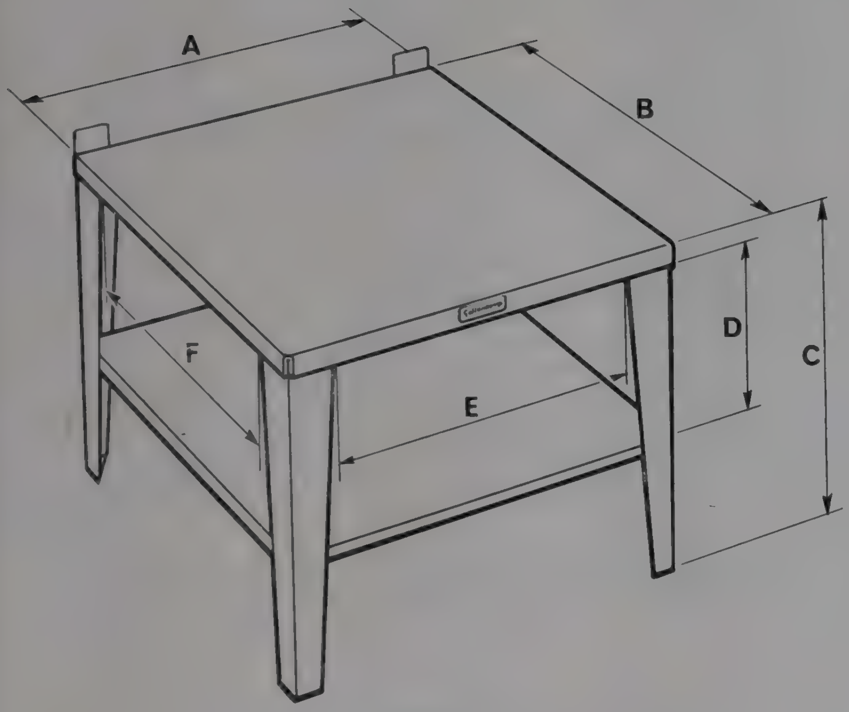
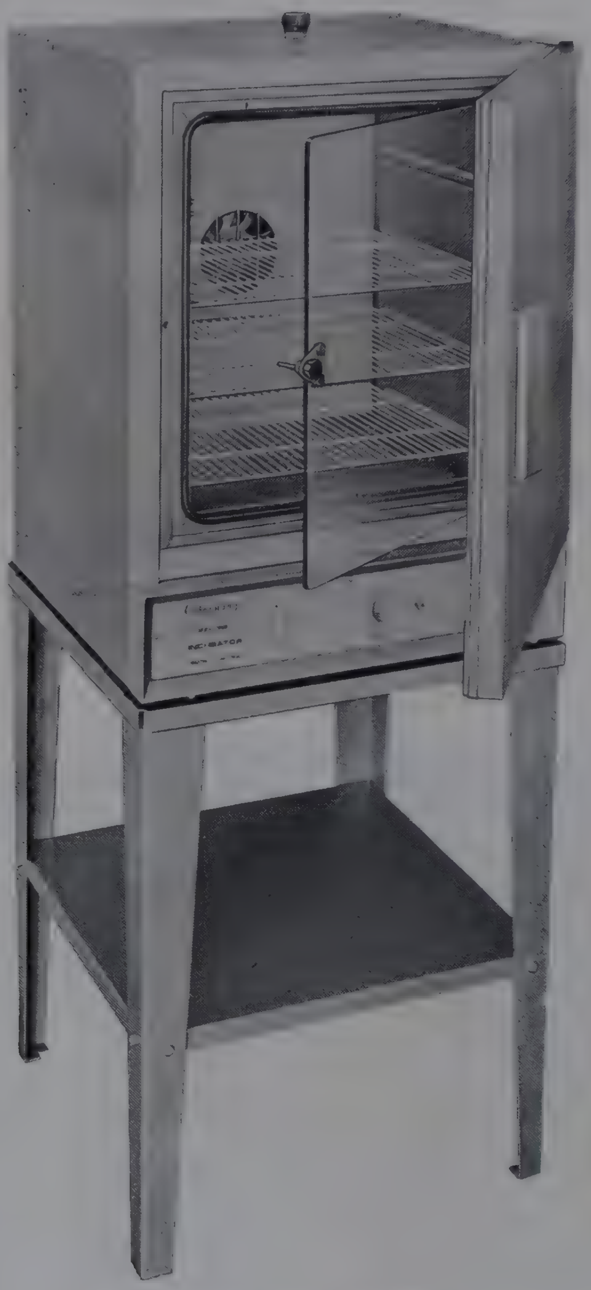


Fig. 1



IH-100 with OV-480

List No.	Suitable for		Dimensions (refer to Fig. 1)						Each	
	List No.	Size	A	B	C	D	E	F		
OV-480	IH-100 OV-060 and OV-062 OV-160 and OV-165 OV-330 and OV-335	No. 1 No. 1 No. 1	57 22½	57 22½	70 28	36·5 14½	40 16¼	40 cm 16¼ in	£ 16·50	*b*
OV-482	IH-100 IH-150 OV-010 OV-160 and OV-165 OV-330 and OV-335	No. 2 Nos. 1 and 2 Nos. 1 and 2 No. 2 No. 2	67 26½	67 26½	63·5 25	34 13	51 20¼	51 cm 20¼ in	17·50	*b*
OV-484	IH-100 OV-160 OV-165 OV-420 and OV-425 OV-440 and OV-445	No. 3 No. 3 No. 3	77 30½	67 26½	56 22	29 11½	62 24¼	51 cm 20¼ in	19·00	*b*

All items on this page normally available from stock.

Gallenkamp NON-INJECTION HUMIDITY OVEN, 60°C

WITH SALT TRAY HUMIDIFIER

WITH Compenstat (SOLID STATE) CONTROL

APPLICATIONS

Conditioning samples prior to electrical or mechanical tests.

Absorption and permeability measurements on packaging and other materials.

Shelf life tests on components packaging, etc. under simulated temperate or tropical conditions.

Corrosion tests on mechanical assemblies.

Gallenkamp
HUMIDITY
OVEN

OV-620

- Accurate temperature and humidity control
- Compenstat (solid state) temperature controller
- Safety thermostat to protect samples
- High level controls unaffected by spillage
- Built-in cooling coil and solenoid valve
- Stainless steel liner and shelves
- Glass inner door for observing samples
- Water tight rim seal on inner door

PERFORMANCE

Temperature range	approx. ambient to 60°C
Temperature variation	±0·5degC
Temperature fluctuation	±0·1degC
Drift over 72 hours	not more than 1degC or 2% r.h.
Reproducibility	±0·5degC and ±2% r.h.
Recovery time at 60°C	30 minutes
Humidity range	0 to 95% r.h. at all temperatures

Gallenkamp NON-INJECTION HUMIDITY OVEN

(continued)

DESIGN

Temperature is accurately and reliably controlled by a direct reading *Compenstat* (solid state) and an independent safety thermostat is fitted. A stainless steel sheathed heater mounted round the motor driven fan ensures rapid temperature response and minimum fluctuation. When working at or near ambient temperature cooling is required. This is provided by passing cold water through the built-in cooling coil and solenoid valve. The valve permits the passage of water alternatively with operation of the heater and so reduces dependence on cooling water supply conditions.

Humidity control is based on the fact that the relative humidity of air in contact with saturated salt solutions reaches known equilibrium values at given temperatures. The large area salt tray ensures that the atmosphere within the oven reaches equilibrium rapidly.

Controls comprise a direct reading *Compenstat* (solid state), an independent direct reading safety thermostat, a load indicator lamp, mains switch and a safety thermostat takeover indicator lamp. All controls and associated circuitry including the solenoid valve are housed at the top of the oven and are therefore protected from spillage of water or salt solutions.

The exterior of the oven is easily cleaned and is finished with a light grey stoved enamel. The inner glass door is fitted with a rubber gasket which forms a good seal with the oven liner. The outer door has a magnetic rubber gasket.

The oven is efficiently lagged with closed cell plastics foam, which forms a water seal should the liner be accidentally punctured, and so prevents seepage of corrosive salt solutions and water vapour to the outer case. The oven liner is of corrosion resistant stainless steel to BS 971, EN 58B with fixed shelf runners and an easily removable baffle at the rear which guards the heater fan and cooling coil. There are no electrical connections within the working space.

The inner glass door permits viewing of samples under test and incorporates a water tight rim seal to prevent loss of moisture while the oven is operating. A low power subsidiary heater is used to minimise condensation on and around the inner door and a gutter is fitted to collect any water which drips from the glass door as it is opened.

The shelves are perforated stainless steel and the smooth finished plastics salt tray is housed below the solid base-shelf which can be removed for cleaning.

DIMENSIONS

	H W D
Internal	68 × 61 × 46 cm 27 × 24 × 18 in
External	112 × 79 × 79 cm 44 × 31 × 31 in
Shelves	
Number supplied	3
Number of positions	5
Interval between positions	12 cm 4¾ in

The removable base can be used as a shelf

Weight, net	100 kg
Power rating, max.	2 kW
Approximate weight of salt required for salt tray	**3 kg**

OV-620

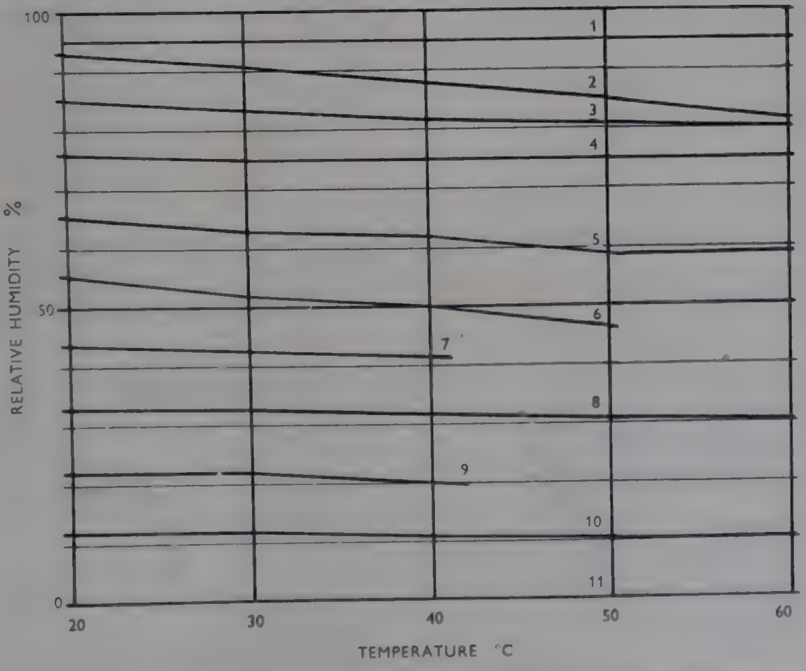
HUMIDITY OVEN, NON-INJECTION, *Gallenkamp*, as specification. With *Compenstat* (solid state) temperature control to 60°C, independent safety thermostat, cooling coil, solenoid valve, stainless steel liner, 3 perforated shelves, base-shelf, plastics salt tray and inner glass door. For single phase a.c. supplies.

For 220/240V 50 Hz	Each	**£375·00**	*b*
For 200/210V 50 Hz	Each	**£376·00**	*bN*
For 110/120V 60 Hz	Each	**£376·00**	*bN*

REPLACEMENT PARTS

OV-625	**Salt tray,** plastics	Each	**£10·25**	*b*
OV-627	**Shelf,** perforated stainless steel ...	Each	**£5·00**	*b*
OV-170	**Heater,** 2 kW, size no. 3 ...	For prices see entries in List No. sequence.		
OV-172	**Fan motor**			

TEMPERATURES AND RELATIVE HUMIDITIES NORMALLY ATTAINABLE IN 20°C AMBIENT TEMPERATURE



Material to be placed in tray to obtain indicated values of relative humidity shown in graph on left.

Curve No.	Material
1	Distilled water
2	Potassium nitrate—saturated solution
3	Potassium chloride ,, ,,
4	Sodium chloride ,, ,,
5	Sodium nitrite ,, ,,
6	Sodium dichromate ,, ,,
7	Potassium carbonate ,, ,,
8	Magnesium chloride ,, ,,
9	Potassium acetate ,, ,,
10	Lithium chloride ,, ,,
11	Silica gel—dried.

For details of salts suitable for other relative humidities see Journal of Scientific Instruments **25**, 1948, 73.

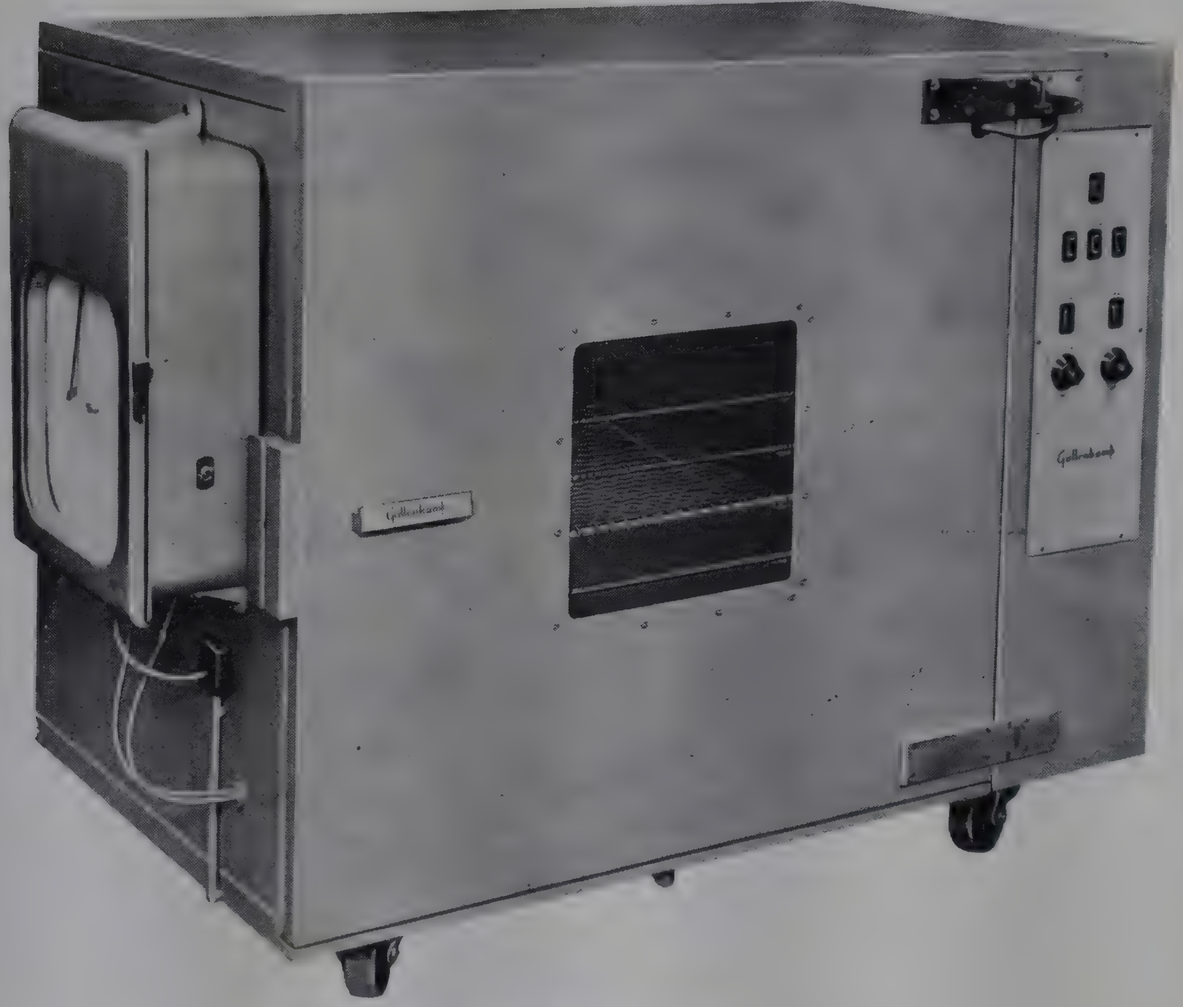
Items on this page normally available from stock except those coded *N*.

Gallenkamp HUMIDITY OVEN, 100°C

WITH STEAM INJECTION HUMIDIFIER TO BS 3898 'LABORATORY HUMIDITY OVENS (INJECTION TYPE)'

For climatic and durability tests of electrical and electronic apparatus materials and components, for accelerated weathering tests of surface coatings and packing materials, for simulated tropical and extreme tropical conditions and for various botanical and zoological investigations.

- **Temperature control to within ±0·5degC**
- **Insulated stainless steel humidity chamber**
- **Air circulation by powerful centrifugal fan**
- **Up to nearly 100% humidity at all operating temperatures**
- **Welded steel outer case with castors for easy movement**
- **Adjustable safety thermostat**



OV-700 with OV-780

Suitable for the following standard test methods:

BS 2011	Basic climatic and durability tests for components for radio and allied electronic equipment.
DEF 133	Climatic, shock and vibration testing of service equipment.
DEF 1234	General requirements for packaging supplies for the services.
DEF 5011	Climatic and durability testing of service electronic components.
DTD 919B	Electroplating of aluminium, steel and copper with silver and nickel.
DTD 1085C	Climatic testing of airborne instruments and equipment.
DTD 1086C	Climatic testing of ground instruments and equipment.
IEC 68, 2nd Edition	Basic environmental testing procedures for components for electronic equipment.
ISAT	Intensified standard alternating trials, series A & B.
K 114, Issue 2	Climatic and durability testing of service telecommunication equipment.
K 1007, Issue 3	Semiconductor devices.
MIL-E-5272C	Environmental testing of aeronautical and associated equipment.
MIL.STD.202B	Methods 103 and 106.
RCS 11, Issue 5	Climatic and durability testing of service electronic components.
RIC 11	Climatic and durability tests for components for radio and other electronic equipment.

Gallenkamp HUMIDITY OVEN

REGD TRADE MARK

PERFORMANCE AND CONSTRUCTION OF BASIC HUMIDITY OVEN

Humidity chamber

Constructed from stainless steel and insulated with fibre glass, the humidity chamber is fitted with runners for two 2·4 cm grid wire shelves. Circulating air is ducted across the heater to top and bottom of the chamber. For rapid, accurate response, the bulbs of the controlling contact thermometers are placed close to the fan, within the air duct. Drainage is provided for accummulated condensate.

The door is fitted with a heated, double glazed window 30 × 30 cm for unimpeded viewing of samples under test. The door closes to make the whole chamber substantially airtight.

Control equipment

A lift-out end panel permits easy access to all control equipment and circuits including the connections to the front panel controls.

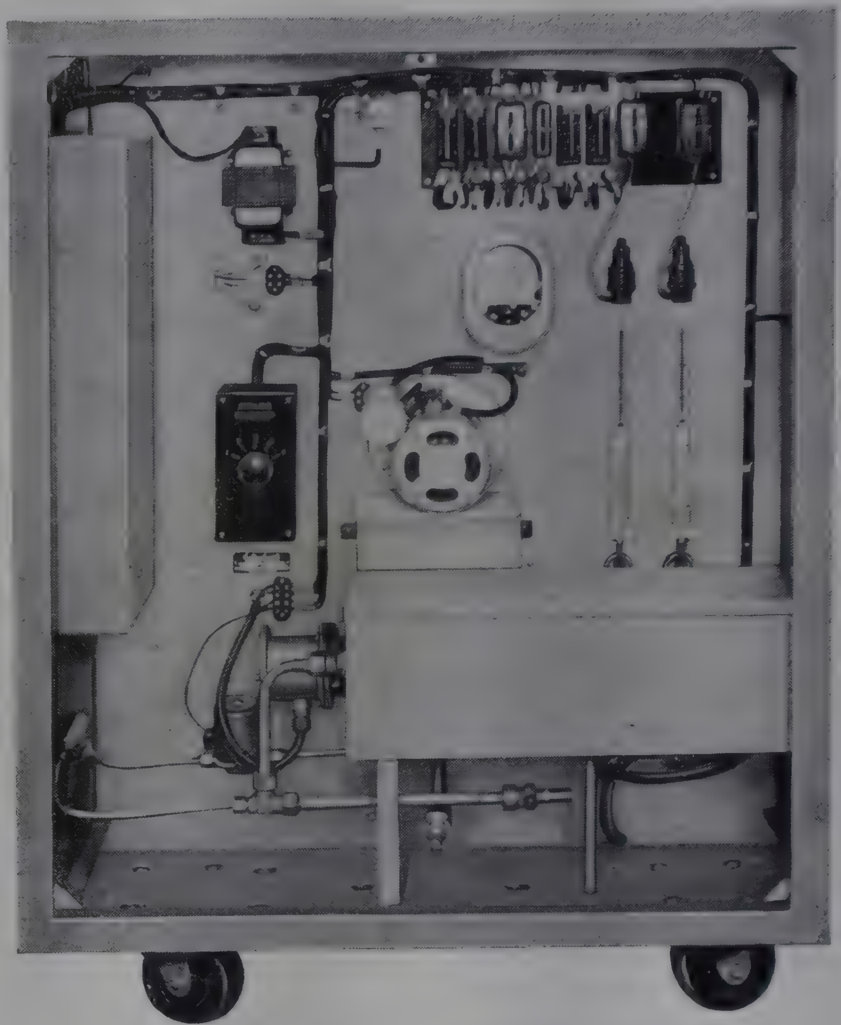
(1) Temperature control systems

Oven temperature is controlled to ±0·5degC by means of the dry bulb contact thermometer. Protection from overheating is provided by an adjustable snap-action safety thermostat which can be preset in the range 20 to 100°C. The energy regulator in the heater circuit may be adjusted to provide the optimum average heating rate for the operating temperature.

(2) Humidity control systems

Humidity is controlled by a second contact thermometer, the bulb of which is sleeved with a cotton wick which dips into a constant level water trough. This wet bulb thermometer is set at a temperature less than the nominal oven temperature by the depression equivalent to the required relative humidity. It is not possible to state actual figures for the regulation obtained, as the percentage variations depend on working temperatures, but the wet bulb depression can be maintained to 0·5degC or better, when the controls are correctly set. External conditions can affect the working conditions at the lower end of the temperature range. Provision is made to reduce the control sensitivity when wider range temperature cycling is required.

Steam is produced in a small boiler and is introduced near the fan to ensure that it is rapidly dispersed throughout the chamber. The boiler is fed with water from a constant level cistern and is heated by an immersion heater. An integral safety thermostat prevents damage in case of boiling dry. The system of direct steam injection is capable of giving practically 100% relative humidity at all temperatures. The minimum conditions obtainable depend on ambient humidity and temperature, but since the oven can be effectively sealed, low values of humidity can be obtained by using drying agents, the refrigeration accessory OV-850 or the air injection fan OV-845.



Control compartment of OV-700 with OV-810

DIMENSIONS

	H	W	D
Dimensions, internal	71 ×	81 ×	68·5 cm
	28 ×	32 ×	27 in
external	109 ×	122 ×	79 cm
	42 ×	48 ×	30 in
Door opening	71 ×	71 cm	
	28 ×	28 in	
Weight, net	190 kg		
	420 lb		
Power rating, max.	3 kVA		

For ordering specifications see overleaf.

Gallenkamp HUMIDITY OVEN AND ACCESSORY EQUIPMENT

OV-700

HUMIDITY OVEN, *Gallenkamp*, as specification, with stainless steel humidity chamber, wet and dry bulb contact thermometers, ducted centrifugal fan, steam injection system, sheathed heater, safety thermostat, condensate drain and heated double glazed window in door. **Without shelves.** For single phase supplies.

For 220/240V 50 Hz	Each	**£955·00**	*bN*
For 200/210V 50 Hz	Each	**£960·00**	*bN*
For 110/120V 60 Hz	Each	**£960·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

OV-718	**Contact thermometer,** scale span 0 to 110°C in 1degC.	Each	**£13·25**	*c*
OV-722	**Insulating sleeve, PVC,** placed over the bulb of the contact thermometer to increase the differential to between 2 and 3degC	Each	**£0·35**	*b*
OV-724	**Wicks,** for thermometer OV-718.	Pack of 12	**£0·60**	*c*

When ordering replacement parts please quote apparatus number and state voltage and frequency of supply.

TREATMENT OF WATER SUPPLY TO HUMIDITY OVEN

In hard water areas it is advisable to supply the boiler with deionised or distilled water to prevent the deposition of chalk.

ACCESSORIES

MISCELLANEOUS FITTINGS

OV-735

SHELF, wire mesh, two can be used in oven OV-700. Each **£20·00** *b*

OV-740

EXTENSION LEGS, 30 cm long to raise the oven above the floor in order that a large drainage tray can be used in the absence of a suitable floor drain. Set of 4 **£26·50** *b*

OV-765

PANEL WITH BUSHINGS, for making electrical connections to equipment inside the oven. Comprises a detachable metal panel 13 × 13 cm, fitted with four bushings rated at 5000V 30A, and suitable for frequencies up to 200 MHz ... ... Each **£28·00** *bN*

No extra fitting charge is made if ordered with oven.

Note that other bushings can be fitted and that cables can alternatively be taken through the ventilation aperture.

OV-770

REMOTE CONTROL KNOB, for operating the controls of equipment under test inside the oven. Comprises a $\frac{5}{16}$ in diameter rod in a plain bearing fitted at one end with a bakelite knob. The other end projects inside the oven and can be coupled through a suitable driving link to the equipment under test. Subject to considerations of the construction of the oven and the other accessories used, the control knob may be fitted to almost any part of the end wall opposite to the control compartment. Each **£3·40** *bN*

No extra fitting charge is made if ordered with oven.
When ordering please state preferred location of knob.

HUMIDITY MEASURING AND RECORDING EQUIPMENT

OV-780

RECORDING HYGROMETER, *Bristol's*, wet and dry bulb with synchronous electric motor giving 24 hr rotation. The recorder charts are 12 in diameter with range 0–100°C. Complete with water trough, piping for connecting trough to oven water system, wet bulb wick, mains cable and instructions ... ... Each **£130·00** *m*

No extra fitting charge is made if ordered with oven.

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-782	**Wicks,** for wet bulb	Pack of 5	**£2·75**	*c*

HV-110

HYGROMETER, wet and dry bulb, scale span 0–100°C in 1degC. For full details and price see entry in List No. sequence.

TK-150

THERMOHYGROGRAPH, for daily recordings. For full details and price see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp HUMIDITY OVEN—ACCESSORY EQUIPMENT

(continued)

PROGRAMME CONTROL SYSTEMS

No extra charge is made for fitting these systems if they are ordered to be supplied with the oven. When ordering control systems please state voltage and frequency of supply.

■ SIMPLE TIME CYCLE CONTROLLER

Either or both air heater and boiler can be switched on and off at adjustable times. The oven can thus be cycled between controlled conditions and approximately ambient conditions once every 24 hours.

OV-805
TIME SWITCH, with 24 hour dial and one pair of contact arms ... ... Each **£15·50** *bS*

■ GENERAL PURPOSE PROGRAMME CONTROLLER

Provides the following programmes:

1. Continuous control by wet and dry bulb contact thermometers, time switch and spray cooling inoperative.
2. As 1 but with time switch producing automatic cycling between controlled conditions and approximately ambient once every 24 hours.
3. As 2 but with water spray operating during cooling period.
4. Heating by boiler only with time switch producing automatic cycling between any temperature and approximately ambient temperature with near 100% r.h. throughout. Spray cooling inoperative.
5. Heating by air heater only and time switch producing automatic cycling between any temperature and approximately ambient once every 24 hours.

These programmes are suitable for general damp heat and simulated tropical exposure tests including the following standard methods:

Dry heat tests to: BS 2011, DEF 133, DEF 5011, DTD 1086C, RCS 11 and RIC 11.

Damp heat or accelerated damp heat tests to: BS 2011, DEF 133, DEF 5011, IEC 68, K 114, K 1007 method A, RCS 11 and RIC 11.

Humidity tests to: DTD 919B, MIL-STD-202B method 103A and MIL-E-5272C procedure 3.

Tropical exposure and life tests to: DEF 133, DTD 1085C, DTD 1086C, K 114 and RCS 11.

Other tests: K 1007 method B and MIL-E-5272C procedure 1.

OV-810
GENERAL PURPOSE PROGRAMME CONTROLLER, as specification including OV-840 water spray cooler, OV-805 time switch and 5-position switch. Each **£59·00** *b*

■ PROGRAMME CONTROLLER for K 1007 and MIL STD 202

By the addition of an extra contact thermometer, a time switch with two contact arms, a water spray cooler, a relay and a switchbox, the oven can be made to reproduce automatically the cycle specified in specification K 1007 method C and MIL STD 202B method 106A.

OV-817
PROGRAMME CONTROLLER K 1007 and MIL STD 202B, as specification including additional contact thermometer, time switch, OV-840 water spray cooler, relay and switchbox ... ... Each **£70·00** *b*

OV-819
PROGRAMME CONTROLLER providing the combined facilities of the OV-810 general purpose programme controller, and OV-817 programme controller for K 1007 and MIL STD 202B ... ... Each **£98·00** *b*

■ PROGRAMME CONTROLLER for ISAT test schemes

By the addition of extra contact thermometers, a 3-pole changeover time switch and selector switches the oven can be made to reproduce the A and B test schedules of the Ministry of Supply Intensified Standard Alternating Trials (ISAT).

OV-820
PROGRAMME CONTROLLER for ISAT test schedules as specification including contact thermometers, time switch and selector switches. Each **£125·00** *b*

REPLACEMENT PARTS

OV-830	**Thermometer,** fixed contact, 115°F ...	Each	**£7·00**	*cS*
OV-832	**Thermometer,** fixed contact, 167°F ...	Each	**£7·00**	*cS*

ACCESSORY

OV-834	**Recording hygrometer** as OV-780, but with 7 day chart	Each	**£130·00**	*mS*

SPECIAL PROGRAMME CONTROL SYSTEMS

Control circuits for special programmes can be considered on receipt of full details of requirements.

Items on this page coded S normally available from stock.

Gallenkamp HUMIDITY OVEN—ACCESSORY EQUIPMENT

(continued)

ACCELERATED COOLING AND DRYING EQUIPMENT

OV-840

WATER SPRAY COOLER, for increasing the cooling rate of the oven and for maintaining saturated conditions during cooling periods. This accessory comprises an atomising spray connected to the water system through a filter and a solenoid valve which is controlled by the wet bulb contact thermometer. An isolating switch enables the oven to be used without spray cooling.
Each **£27·50** *b*

OV-845

AIR INJECTION FAN, for reducing the relative humidity in the oven rapidly and for maintaining relative humidities close to the theoretical minimum for the ambient conditions. A centrifugal fan blows room air into the control compartment. An isolating switch is fitted.
Each **£26·50** *b*

When ordering accessory equipment please state voltage and frequency of supply.

OV-700 with OV-850

REFRIGERATION EQUIPMENT

For operating the oven at temperatures below ambient or for dehumidifying. The cabinet is not suitable for operation below 0°C.

Ambient temperature °C	20	25	30	35	40	43
Minimum working temperature °C	0	3	6	9	11	13

The refrigerator is mounted on the top of the oven. In use it is run continuously and temperature control is provided by the dry bulb contact thermometer in conjunction with the oven heater. Excess pressure and overload protection devices are built in.

OV-850

REFRIGERATION EQUIPMENT, as specification, for operation in locations where the ambient temperature does not exceed 35°C ... ... Each **£312·00** *b*
No extra fitting charge is made if ordered with oven.

OV-852

REFRIGERATION EQUIPMENT, as specification, for operation in locations where the ambient temperature does not exceed 50°C ... ... Each **£331·00** *b*

No extra fitting charge is made if ordered with oven.

ULTRAVIOLET IRRADIATION EQUIPMENT

For simulating the weathering effect of sunlight under various conditions of temperature and humidity.

This powerful source of ultraviolet radiation comprises a high pressure mercury arc tube in a well ventilated housing, with an anodised aluminium reflector.

The radiation passes through a polished silica window which is sealed into the oven wall by means of a moisture proof gasket. The arc tube is a straight quartz tube, with solid activated electrodes giving an effective arc 13 cm long. Provision is made for increasing the voltage supplied to the tube in order to maintain constant intensity as the tube ages.

SPECTRUM

The arc tube generates the characteristic high pressure mercury arc covering the spectrum range from 1849·5Å. The ultraviolet radiation from the tube is 60W out of a total radiant emission of 250W. The intensity of radiation below 3200Å is $430\mu W/cm^2$ at a distance of 1 metre, measured without a reflector.

OV-860

ULTRAVIOLET IRRADIATION EQUIPMENT, as specification, with control unit. Total average consumption 550W. For 110/120 or 200/250V a.c. single phase ... ... Each **£200·00** *g*

No extra fitting charge is made if ordered with oven.

REPLACEMENT PART

OV-866	**Quartz tube**	Each **£15·50** *fS*

Items on this page coded *S* normally available from stock.

Gallenkamp DRYING CABINET

For rapid and controlled drying of glassware or chromatography paper up to sheet size 58×68 cm.

- **Maximum temperature 120°C**
- **Large capacity**
- **Toughened glass doors**
- **Temperature control by direct reading thermostat**

OV-880 with OV-892

DESIGN

The heating elements, which are protected from spillage by baffles, are housed in the bottom compartment of the cabinet. Hot air convects rapidly through the cabinet interior and emerges through the adjustable ventilator at the top, carrying away with it moisture and other vapours.

The interior of the cabinet is lined with asbestos board insulation. Temperature is controlled by means of an hydraulic thermostat calibrated from 30 to 120°C in 5degC subdivisions. The indicator lamp shows when the heater is on.

PERFORMANCE

Temperature fluctuation	±3degC
Temperature variation	8degC
Time to heat to 100°C	30 min
Power rating, max.	1·8 kW

DIMENSIONS

Shelves

Dimensions	67×33 cm (26½×13 in)
Number supplied	2
Number of positions	4
Interval between positions	15 cm (6 in)

Dimensions

	H		W		D	
Internal	72	×	64	×	37	cm
	28½	×	25	×	14½	in
External	107	×	76	×	38	cm
	42	×	30	×	15	in
Weight (net)	52 kg				114	lb

OV-880

DRYING CABINET, *Gallenkamp*, as specification, with hydraulic thermostat and load indicator lamp, toughened glass doors, adjustable ventilator, one each 12·5 and 25 mm wire mesh shelves. For a.c. single phase supplies.

For 220/240V	Each	**£104·00**	*b*
For 200/210V	Each	**£105·00**	*bN*
For 110/120V	Each	**£105·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-884	**Heating element**	Each	£2·40	*b*

When ordering replacement parts please state Serial No. of oven and supply voltage.

ACCESSORIES

OV-886	**Extra shelf,** 12·5 mm mesh	Each	**£2·10**	*b*
OV-887	**Extra shelf,** 25 mm mesh	Each	**£2·10**	*b*
OV-889	**Rack,** with clips for suspending six sheets of chromatography paper, to fit within the top of the cabinet.	Each	**£7·50**	*b*
OV-890	**Extra clips,** for OV-889 ...	Pack of 12	**£3·40**	*b*
OV-892	**Exhaust fan,** for fitting in place of the top ventilator to increase the rate of removal of moisture or fumes. Its outlet, which is suitable for connecting to ducting of extraction systems, takes 76 mm bore tubing. For single phase supplies only.			
	For 200/250V 50 Hz	Each	**£25·00**	*b*
	For 110/120V 60 Hz	Each	**£26·00**	*bN*

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

Gallenkamp VACUUM OVENS, 150°C

For accelerated batch drying or for preventing decomposition of heat sensitive materials without loss of drying speed. With uses in chemical, biological, pharmaceutical and other fields.

- **Temperature control within 0·5degC**
- **Two sizes available**
- **All controls built-in**
- **Diaphragm vacuum valves**
- **Glass fibre reinforced plastics case**
- **Safe, reliable operation**

OV-930

Suitable pumps for use with vacuum ovens see VACUUM section.

DESIGN

The oven comprises an anodised aluminium alloy vacuum chamber with a self-aligning door fitted with an observation window. Surrounding the chamber is a glass reinforced plastics outer case which remains cool at all operating temperatures and is easily kept clean.

A thermometer, range 30 to 150°C, is fitted below the lower shelf and is visible through the window.

Heating is by built-in heaters controlled by a direct reading thermostat. A load lamp indicates when the heaters are energised.

To leave the vacuum chamber free from obstruction, the vacuum fittings are all mounted on the door. They comprise a vacuum dial gauge and two diaphragm valves with insulated handles which remain cool at all operating temperatures. The valves are for vacuum line connection and air bleed respectively and the nozzles of both point downwards to avoid possible kinking of flexible connecting tubes. The nozzles are serrated and accept 6·5–8 mm bore vacuum tubing.

PERFORMANCE

Size No.	1	2
Temperature range	ambient+5degC to 150°C	
Time to heat to 150°C	45 min	60 min
Temperature fluctuation	within 0·5degC	
Vacuum and gauge range	0–760 mm (0–30 in) Hg	

DIMENSIONS

	1	2
Number of shelves	2	2
Shelf dimensions	25×30 cm (10×12 in)	33×45 cm (13×18 in)
Distance between shelves	12 cm (4·5 in)	14 cm (5·5 in)
Internal dimensions		
Diameter	30·5 cm (12 in)	37 cm (14·5 in)
Maximum depth	32·5 cm (13 in)	50 cm (20 in)
External dimensions	H W D	H W D
	50×47×57 cm	63×56×68 cm
	20×18·5×23 in	25×22×27 in
Power rating, max.	800W	1150W

OV-930

OVEN, VACUUM, *Gallenkamp*, electrically heated, as specification, with glass reinforced plastics outer case, direct reading thermostat and heater load indicator lamp, door with observation window, mercury in glass thermometer, vacuum dial gauge and two diaphragm vacuum valves. Supplied with two shelves.

Size No.		1	2	
For 220/240V a.c.	Each	**£124·00**	**181·00**	*g*
For 200/210V a.c.	Each	**£127·50**	**185·00**	*gN*
For 110/120V a.c.	Each	**£127·50**	**185·00**	*gN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

OV-932	Thermometer, range 30 to 150°C ...	Each	£1·15	c
OV-934	Door gasket, for size 1 oven	Each	£2·20	g
OV-936	Door gasket, for size 2 oven	Each	£3·30	g

ACCESSORY

TX-755 Tubing, neoprene, heavy wall. Designations H6·5 and H8. For details and prices see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

PAINT TESTING

This section lists a selection of the more important specialised apparatus required in the paint testing laboratory. Most apparatus complies with AID, DEF, BS or other specifications. Apparatus accommodating test panels takes standard 6×4 in panels unless otherwise stated. In most instances brief outline specifications only are given, but fully detailed pamphlets are available on application. We shall be pleased to quote for any apparatus not included in this list. General apparatus not exclusively used for paint testing purposes will be found under appropriate headings throughout the catalogue.

Gallenkamp PAINT CORROSION OVEN

REGD. TRADE MARK

For investigating the resistance of paints to conditions of high temperature and humidity. It conforms to requirements of M.O.S. specification DEF 1053, Method 25, and BS 3900 Part F2 'Resistance to Humidity under condensation conditions'.

ELECTRICAL CONTROLS

The electrical controls, mounted on the side of the oven, comprise a motor switch, mains and thermostat indicator lamps and the thermostat heads.

HUMIDITY

A partition in the liner base forms a shallow water trough which is heated by a 450W immersion heater enabling 100% r.h. conditions to be maintained. Two drain cocks are fitted, one for removal of water from the trough and the other for removal of condensation collecting on the inner surface of the door.

TEMPERATURE

Two bimetallic thermostats are mounted above the water trough and adjacent to a constant speed fan which circulates the air efficiently. The thermostats may be set to allow the temperature to cycle between 42 and 48°C or as required, and by adjustment of a resistor in series with the heater a time cycle within 60 ±5 min, can be obtained.

NOTE: It is only possible to obtain the required temperature cycle in ambient temperatures up to about 30°C. In higher ambient temperatures, cooling is required. Details on application.

DESIGN

The electrically heated oven is strongly constructed in asbestolite and stands on four aluminium legs which allow adequate space for inserting a drip tray. The interior and door box are stainless steel with an air space all round. The door is fitted with robust hinges and is closed, against a moulded rubber gasket, by a roller bolt catch. The oven will take six racks PB-212 each accommodating eight test panels.

PB-210 with PB-212 and PB-215

DIMENSIONS

	H	W	D
Overall	105 ×	69 ×	53 cm
Internal	74 ×	40 ×	38 cm
Racks	9 ×	39 ×	11 cm

PB-210
OVEN, PAINT CORROSION, *Gallenkamp,* as specification. For single phase supplies.

For 220/240V 50 Hz	Each	**£328·00**	*b*
For 200/210V 50 Hz	Each	**£329·00**	*bN*
For 110/120V 60 Hz	Each	**£329·00**	*bN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

PB-212	**Rack,** tinned copper, for 6×4 in test panels, with corrugated sides of ½ in pitch to take 8 test panels at 1½ in intervals	Each	£10·00	*b*
PB-213	**Immersion element,** 450W, replacement.	Each	£2·50	*b*
PB-215	**Thermometer, recording,** circular chart with 0 to 75°C range	Each	£57·00	*f*
IH-110	**Thermometer,** scale span 10 to 60°C. For details and price see entry in List No. sequence.			

Gallenkamp **particle size apparatus** including sedimentation balance and Andreasen pipette see **PARTICLE SIZE APPARATUS.**

Items on this page normally available from stock except those coded *N*.

Gallenkamp SALT SPRAY APPARATUS

PB-230 with accessories

PB-230

SALT SPRAY APPARATUS, *Gallenkamp*, for testing the resistance of paints and allied materials to continuous salt spray as specified in BS 3900 Part F4 and DEF 1053 Method 24. Comprises glass panels set in a nylon coated iron frame to form a tank having internal dimensions 60 × 30 × 29 cm deep. With plate glass cover, having central 2 cm diameter thermometer hole and 2·5 cm diameter vent hole, glass atomiser fitted through the end wall and glass baffle plate to prevent spray from playing directly on test panels. The tank will accept one drainage tray PB-234 and up to four sample racks PB-236. **Without racks, tray or thermometer** ... Each **£12·75** *b*

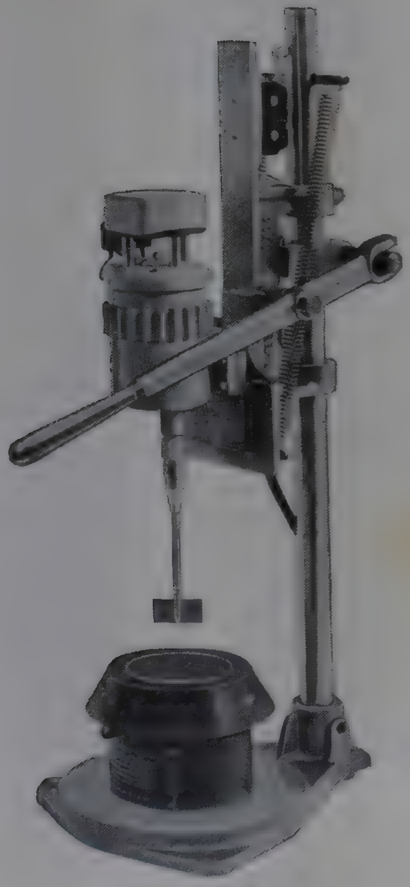
REPLACEMENT PART

PB-232	**Atomiser,** glass	Each	**£0·45**	*a*

ACCESSORIES

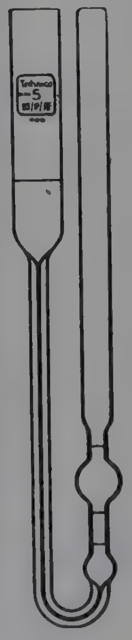
PB-234	**Tray,** drainage, Perspex, to hold four racks PB-236	Each	**£2·10**	*b*
PB-236	**Rack,** Perspex, to hold six test panels...	Each	**£1·25**	*b*
TJ-050	**Thermometer,** range 0 to 60°C. For details and price see entry in List No. sequence.			

Suitable **air compressor** see AF-430 et seq. in List No. sequence. Other **salt spray cabinet** for corrosion testing, see MH-860 in List No. sequence.



PB-255

VS-010



VS-250

VS-132
VS-134
VS-136

VS-145

VISCOMETERS

SUITABLE FOR PAINT TESTING

PB-255

VISCOMETER, ICI ROTOTHINNER, Mk. IIA comprising constant speed motor, stirrer and turntable with a torque measuring attachment. Graduated 0 to 15 poises ... ... Each **£150·00** *fN*

Full details on application.

VS-010

TORSION VISCOMETER, *Gallenkamp.*

VS-110

ROTATING CYLINDER VISCOMETER.

VS-132

FLOW CUP, *Gallenkamp*, **BS 1733 type B2.**

VS-134

FLOW CUP, *Gallenkamp*, **BS 1733 type B4.**

VS-136

FLOW CUP, *Gallenkamp*, **BS 1733 type B6.**

VS-140

FLOW CUP, *Gallenkamp*, **Ford No. 4.**

ACCESSORY

VS-145 Stand for VS-132 to VS-140 with enamelled base, levelling feet and chromium plated rod with adjustable support bracket.

VS-160

ZAHN CUP VISCOMETER.

VS-250

U-TUBE REVERSE FLOW VISCOMETER, *Technico.*

For full details and prices see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

PB-285

HARD DRYING TIME APPARATUS, to DEF 1053 Method 8, comprising a loaded mechanical thumb which is forced round on the surface of the test panel.
Each **£65·00** *f*

PB-301

FILM APPLICATOR, standard, for 4 in. wide panels. Gap size 0·002 in ... ... Each **£9·35** *fS*

PB-302

FILM APPLICATOR, as PB-301 but gap size 0·004 in.
Each **£9·35** *fS*

PB-320

SPINNER, ICI pattern, for applying film of exactly reproducible thickness to test panels. With time switch. For 200/250V 50 Hz supplies ... ... Each **£65·00** *f*

PB-336

BEND TEST HINGE, to DEF 1053 Method 13, for determining the flexibility adhesive properties of a material under specified conditions. With mandrel size ¼ in.
Each **£8·20** *fS*

PB-337

BEND TEST HINGE, as PB-336 but mandrel size ½ in.
Each **£8·20** *fS*

PB-340

FALLING BLOCK IMPACT TESTER, to DEF 1053 Method 17a, comprising a single blow indenter 236 in/lb fall, which produces a predetermined amount of deformation. With stainless steel spacing washers.
Each **£77·00** *f*

PB-382

HARDNESS ROCKER, bubble type, for advanced investigations on hardening time ... ... Each **£26·60** *f*

ACCESSORY

PB-384 **Levelling table and test plate** ... ... Each **£14·20** *f*

PB-390

SCRATCH TESTER, hand operated, to DEF 1053 Method 14. With one 1 mm ball ended needle, weights totalling 2000 g and lamp to indicate complete penetration ... ... Each **£33·70** *f*

REPLACEMENT PART

PB-391 **Needle,** ball ended, 1 mm ... Pack of 12 **£1·95** *f*

PB-400

CRYPTOMETER, for measuring absolute hiding power of paint films. With black and white base plate for light and dark paints, respectively ... ... Each **£41·50** *f*

PB-421

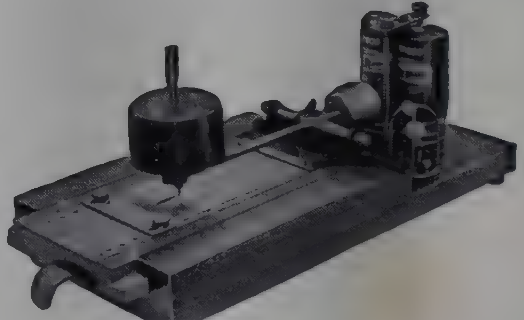
FINENESS OF GRIND GAUGE, double channel, with scraper blade. Maximum depth 0·002 in.
Each **£26·60** *fS*

PB-422

FINENESS OF GRIND GAUGE, as PB-421 but with maximum depth 0·004 in ... ... Each **£26·60** *fS*

PB-390

PB-382 with PB-384



PB-390

PB-430

PB-430

WET FILM THICKNESS GAUGE. Maximum thickness 0·004 in... ... ... Each **£20·75** *f*

Thickness gauge for direct measurement of any non-magnetic coating on a ferrous base-see MH-830 in List No. sequence.

PB-435

WEIGHT PER GALLON CUP, 100 ml, for Imperial gallon. With cover ... ... Each **£6·00** *fS*

Items on this page coded *S* **normally available from stock.**

GRAPH PAPERS

Linear graph papers listed are ruled in blue on cream wove paper with plain margins.

Logarithmic graph papers listed are ruled neutral green on cartridge paper with plain margins.

LINEAR RULINGS

PB-850

PAPER, GRAPH, 13½ × 9 in, ruled 30 × 20 cm both sides in cm and mm. In pack of 100 sheets.
5 packs **£2·80** Pack **£0·60** *m*

PB-852

PAPER, GRAPH, 13½ × 9 in, ruled 12 × 8 in both sides in inches and tenths. In pack of 100 sheets.
5 packs **£2·80** Pack **£0·60** *m*

PB-860

PAPER, GRAPH, 10¼ × 8 in, ruled 24 × 18 cm both sides in cm and mm. In pack of 100 sheets.
5 packs **£2·00** Pack **£0·44** *m*

PB-862

PAPER, GRAPH, 10¼ × 8 in, ruled 9 × 7 in both sides in inches and tenths. In pack of 100 sheets.
5 packs **£2·00** Pack **£0·44** *m*

PB-870

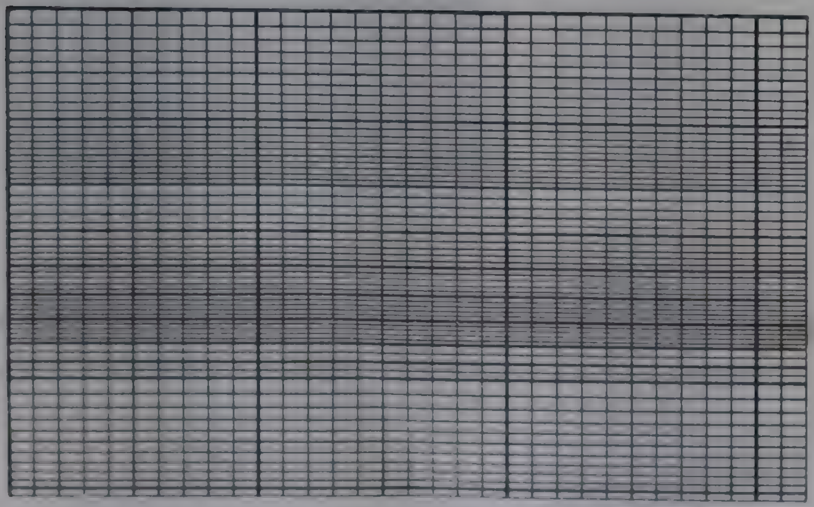
PAPER, GRAPH, in pads of 50 sheets 10¼ × 8 in, ruled 24 × 18 cm one side in cm and mm.
Ten **£2·20** Each **£0·28** *m*

PB-872

PAPER, GRAPH, in pads of 50 sheets 10¼ × 8 in, ruled 9 × 7 in one side in inches and tenths.
Ten **£2·20** Each **£0·28** *m*

PB-900

PAPER, GRAPH, in books of 80 pages 10¼ × 8 in (Physics notebooks), with 23 × 18 cm graph ruling cm in mm on left pages, ruled feint with margin on right, stitched cloth back, semi-stiff cover.
Ten **£1·75** Each **£0·24** *m*



Logarithmic I way.

LOGARITHMIC RULINGS

All papers listed are in cartons of 50 sheets printed one side.

PB-920

PAPER, LOGARITHMIC I way, size A3 (42 × 29·7 cm) with 36 × 25 cm ruled single cycle × cm in mm.
5 cartons **£5·30** Carton **£1·15** *m*

PB-922

PAPER, LOGARITHMIC I way, size A3 (42 × 29·7 cm) with 36 × 25 cm ruled 3 cycle × cm in mm.
5 cartons **£5·30** Carton **£1·15** *m*

PB-930

PAPER, LOGARITHMIC 2 way, size A3 (42 × 29·7 cm) with 25 × 25 cm ruled single cycle × single cycle.
5 cartons **£5·30** Carton **£1·15** *m*

PB-932

PAPER, LOGARITHMIC 2 way, size A3 (42 × 29·7 cm) with 25 × 25 cm ruled 3 cycle × 3 cycle.
5 cartons **£5·30** Carton **£1·15** *m*

GLAZED SAMPLING PAPER

PB-980

PAPER, GLAZED SAMPLING, black, carton of 25 sheets, 20 × 15 in. 10 cartons **£7·60** Each **£0·84** c

PB-982

PAPER, GLAZED SAMPLING, white, carton of 25 sheets, 20 × 15 in. 10 cartons **£7·20** Each **£0·80** c

PLASTICS BACKED PAPER

PB-990

PAPER, ABSORBENT, *Benchkote,* backed with polythene film to prevent liquids penetrating right through and to give the material wet strength and durability. Recommended as a disposable covering for benches, animal cages, humidity cabinets, etc. either to localise spillage or for the collection of falling particles. Particularly useful in radiochemical and bacteriological laboratories. Packet of 50 sheets 46 × 57 cm ... ... Packet **£2·00** *d*

PB-991

PAPER, *Benchkote,* as above but supplied in 50 metre rolls.

Width	46	92 cm	
Roll	**£3·25**	**5·50**	*d*

PAPER, asbestos	see	ASBESTOS GOODS
,, , chromatographic	see	CHROMATOGRAPHY
,, , filter	see	FILTER PAPER
,, , litmus etc.	see	TEST PAPERS
,, , sieve analysis	see	SIEVES

All items on this page normally available from stock.

Technico ANDREASEN PARTICLE SIZE APPARATUS

REGD TRADE MARK

For the determination of particle sizes in materials such as clays, minerals, ceramics, pulverised fuel, cement, etc., by the pipette sampling method as specified in BS 3406 Part 2.

By agreement with Professor A. H. M. Andreasen of Copenhagen, we hold the sole rights of manufacturing and selling this apparatus in Great Britain, Northern Ireland, Eire, the Commonwealth, and North and South America.

Operation

A weighed quantity of powder is shaken with a definite volume of water or other liquid in which it can be dispersed, so that a homogeneous suspension is produced. By means of the pipette, using the 2-way stopcock, 10 cm³ portions of the suspension are extracted from the bottom of the bottle after measured intervals of time, and are transferred to weighed dishes. The contents of the dishes are evaporated to dryness and weighed. Since the times taken by particles to fall through the test distance of 20 cm in the suspension depends on their sizes, the particle size distribution in the powder can be determined from the weights of residue and the elapsed times.

References

Measurements of the fineness of powdered materials, H. Heywood, Trans. Inst of Mech. Engineers, Dec. 1938.
Grain size of whiteware clays as determined by the Andreasen pipette, George A. Lomis, Jour., Amer. Ceramic Soc., **21**, 1938, No. 11.

PC-550

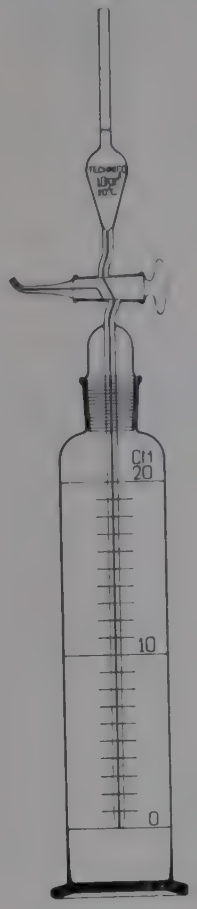
PARTICLE SIZE APPARATUS, Andreasen, *Technico*, as specification, with bottle graduated 0 to 20 cm and standard 10 cm³ pipette ... ... Each **£7·90** *a*

REPLACEMENT PARTS

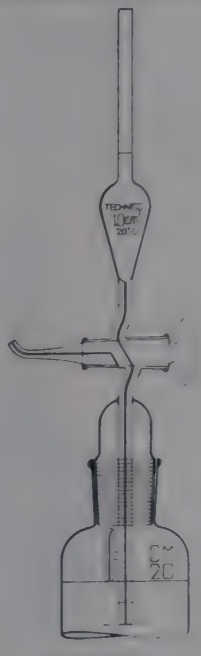
PC-552	**Bottle,** graduated 0–20 cm, 29/32 socket.	Each	**£3·70**	*a*
PC-553	**Pipette,** *Technico*, 10 cm³, 29/32 cone ...	Each	**£4·20**	*a*

ACCESSORY

PC-555	**Pipette,** *Technico*, 10 cm³ modified. For use with exceptionally fine materials using sampling depth of 20 mm, 29/32 cone	Each	**£5·00**	*a*



PC-550



PC-555

PARTICLE SIZE APPARATUS WITH VARIABLE SAMPLING DEPTH

To BS 812 and BS 1377

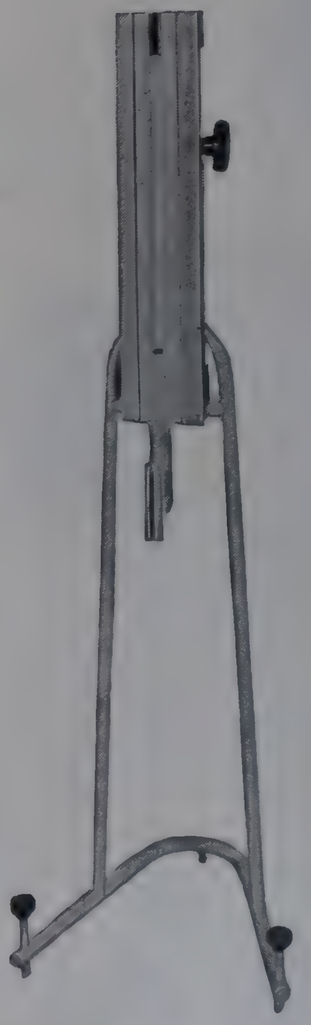
Based on the same principle as the Andreasen apparatus but designed so that samples may be withdrawn from any desired depth.
Consists of a tubular steel stand, with levelling feet and vertical slide having rack and pinion for height adjustment. A scale is fitted to the stand to indicate the movement of the slide. The slide is designed to hold the sampling pipettes listed below with sufficient room underneath for either a 500 cm³ or a 1000 cm³ cylinder containing the sample and, if required, a thermostatic water bath.
The rack and pinion allow the pipette to be lowered into the sample and removed again very smoothly and without disturbing the sedimentation.

PC-600

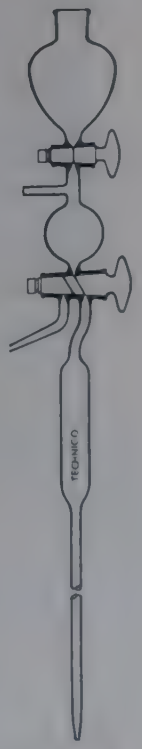
PARTICLE SIZE APPARATUS STAND, as specification. Without sampling pipette or container. Each **£16·50** *b*

ACCESSORIES

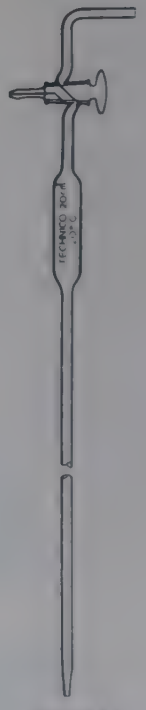
PC-610	**Sampling pipette,** *Technico*, 25 cm³ to BS 812. Incorporating two stopcocks, suction bulb and distilled water reservoir	Each	**£6·00**	*a*
PC-612	**Sampling pipette,** *Technico*, 10 cm³ to BS 1377. Incorporating two stopcocks, suction bulb and distilled water reservoir	Each	**£5·90**	*a*
PC-615	**Sampling pipette,** *Technico*, 20 cm³, simple design incorporating single stopcock only ...	Each	**£2·80**	*a*
CY-104	**Cylinders,** *Technico*, graduated, 500 cm³ and 1000 cm³, to hold samples	For details and prices see entries in List No. sequence.		
SU-760	**Stoppers** for above cylinders, size 41 and 53			



PC-600



PC-610
PC-612



PC-615

Sieves for particle sizing see SE-045 et seq. in List No. sequence.

All items on this page normally available from stock.

Gallenkamp SEDIMENTATION BALANCE

FOR PARTICLE SIZE DETERMINATION IN THE RANGE 5 to 75 μ

British patent No. 712,434. U.S. patent No. 2,699,673.
IN ACCORDANCE WITH BS 3406 Part 2

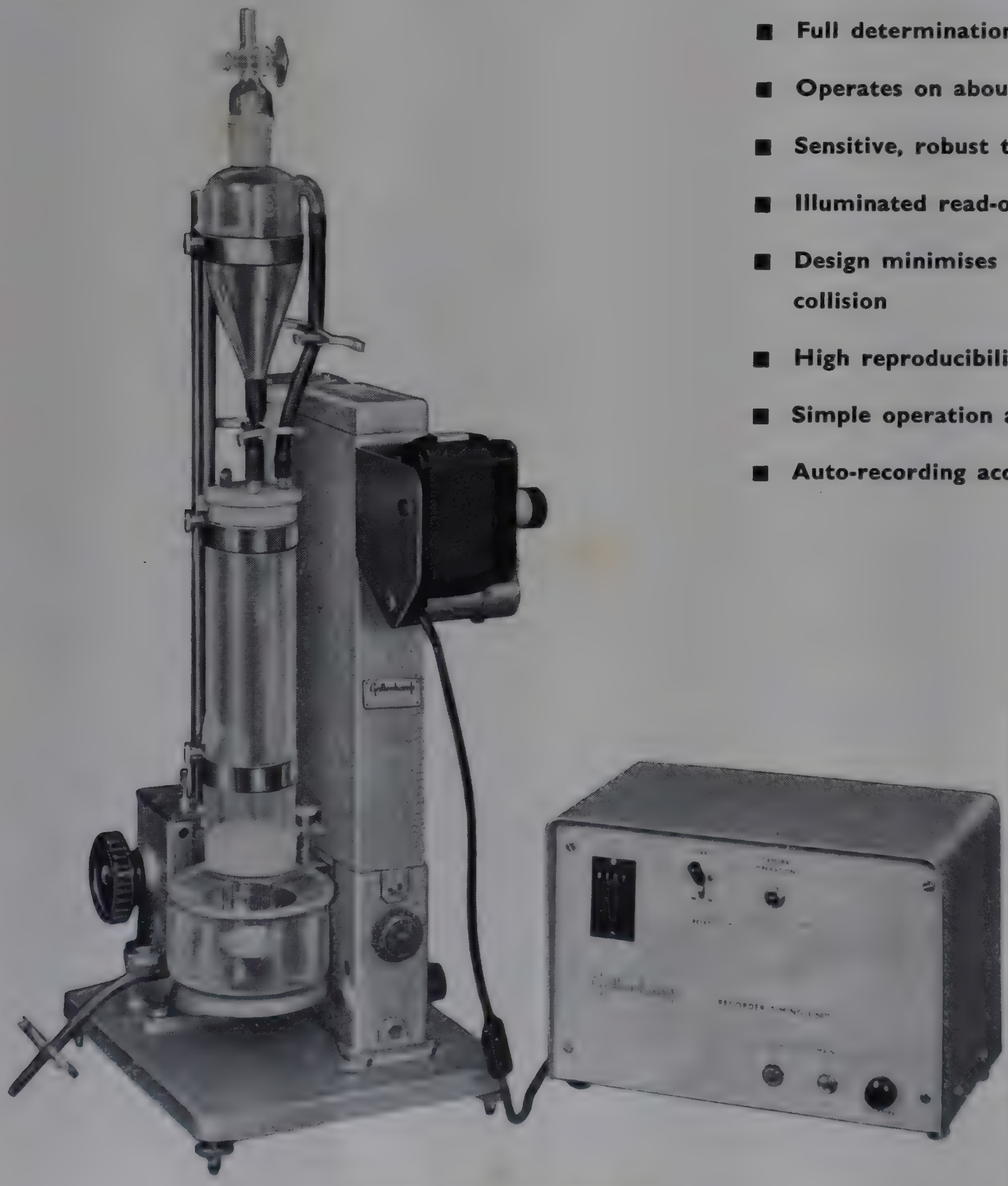
Devised by Mr. W. Bostock of the Research Department, Simon Carves Ltd.

Bibliography

Bostock, W. J.Sci. Inst. **29,** 1952, 209.
Cohen, L. Instrument Practice, **13,** 1959, 1036.
Kaye, B. H. Paint Oil and Colour Journal, July 1966, 212.
Kent-Jones, D. W. and Amos, A. J. Modern Cereal Chemistry 6th Ed., 1967, 192.

Normally used for determination of particle size distribution within the range 5 to 75μ. Where, however, the largest size is not greater than about 20μ, the lower limit may be extended to about 2μ provided the temperature is controlled to within fairly narrow limits and neither agglomeration nor flocculation takes place.

- **Full determination from 5μ to 75μ in 6 hours**
- **Operates on about 0·5 g of sample**
- **Sensitive, robust torsion balance system**
- **Illuminated read-out from torsion balance**
- **Design minimises errors due to buoyancy and particle collision**
- **High reproducibility**
- **Simple operation and maintenance**
- **Auto-recording accessory available**



PC-650 with PC-682 and PC-684

Used successfully to analyse a wide variety of powdered materials including:

Alumina
Boiler and blast furnace dusts
Carborundum
Cement
China-clay
Flints
Flour
Limestone
Metal sintering powders
Paint and other pigments
Plastics powders
Pyrites

Gallenkamp SEDIMENTATION BALANCE

PRINCIPLE

The powder is uniformly dispersed in a suitable liquid and the sedimentation column receiving tank are filled with the same liquid. When released, the particles slowly settle on the torsion balance pan and balance readings are taken at intervals.

The apparatus design minimises errors due to bouyancy and particle collision.

A particle size distribution curve is calculated by a simple formula explained in the instructions manual.

SEDIMENTATION TUBE ASSEMBLY

Comprises sample premixing vessel and sedimentation column. The sample container is internally siliconised, and has a conical base to allow the sample to flow freely into the sedimentation column, to which it is connected by a short length of rubber tubing fitted with a pinch clip A. The two vessels are connected by a second tube, also fitted with a pinch clip B, which allows air displaced by the sample to flow back into the premixing vessel.

The sedimentation column contains 250 ml of sample at a depth of 250 mm. An engraved scale enables the exact height of the suspension to be measured. The column is enclosed in a glass thermal stabilising jacket sealed by gaskets which are resistant to common dispersing media.

RECEIVING TANK

The cylindrical borosilicate glass tank rests below the sedimentation tube on a platform which can be swung sideways to allow the tank to be removed. It is fitted with a circular metal dust cover.

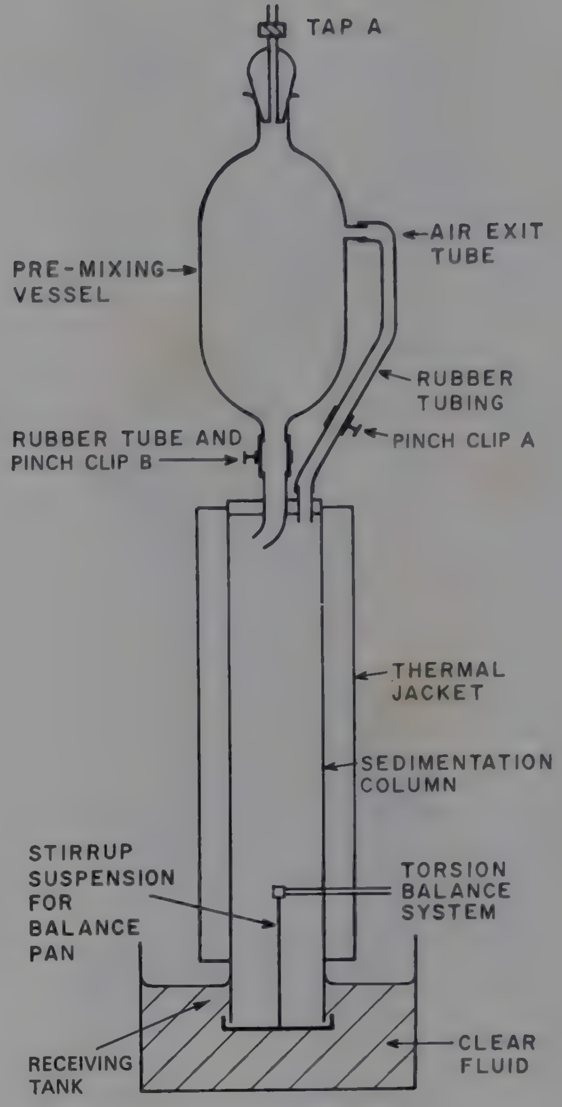
TORSION BALANCE

A horizontal torsion wire suspends a pan system on one side and an adjustable counterbalance on the other. The pan system comprises a light stirrup from which a small pan hangs freely immersed in the tank close to the sedimentation column, so that particles settling to the bottom of the column are caught and weighed in the pan. The mechanism can be clamped, and in the clamped position the pan is held against the sedimentation column. The torsion wire carries a vertical pointer fitted with a graticule, an image of which is projected on to a ground glass scale by an integral optical system. The graticule has an arbitrary scale of 0–100 divisions, and the zero is set by means of a convenient adjusting knob. Two interchangeable balance pans are provided, one of aluminium and one of Perspex.

The counterbalance is used to adjust the sensitivity of the balance and at its most sensitive setting approximately 80% full scale deflection is produced by 0·5 g of powder of specific gravity 1·5 in a liquid of specific gravity 1·0.

STAND

The instrument is assembled on a cast base, 12×10 in fitted with a spirit level and four levelling feet. The vertical rod carrying the sedimentation column assembly is mounted on a slide mechanism incorporating a rack and pinion. Movement of a handwheel raises the sedimentation column clear of the balance pan, so that the pan may be removed for cleaning. The stand, tube support, tank platform and balance casing are finished in a durable stoved enamel. All other metal parts are heavily plated.



OPERATION

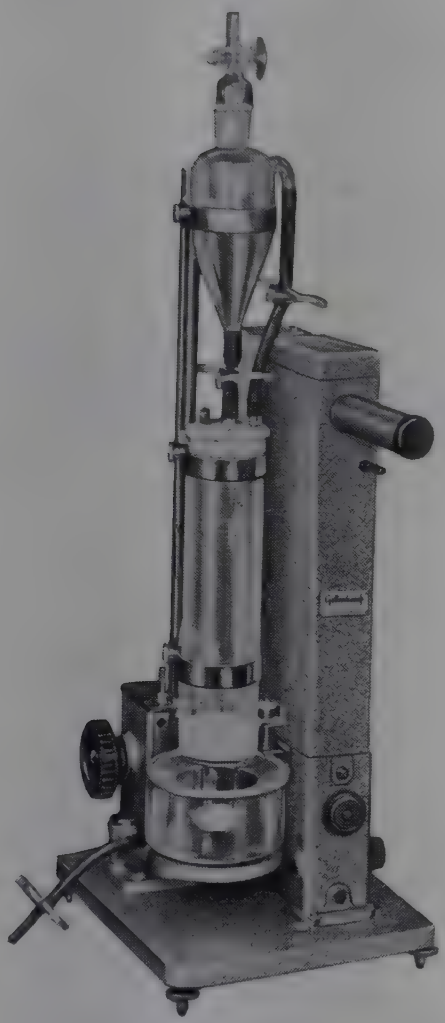
The balance zero is set, the sedimentation column correctly immersed in the receiving tank and the balance is clamped. A uniform dispersion is poured into the sample vessel and the stopper is replaced. The sample is allowed to flow into the sedimentation tube by opening both pinch clips. The clips are closed immediately after entry and a timing device is started. The balance pan is unclamped and scale readings are noted at times increasing by a factor of $\sqrt{2}$ up to 362 min. A simple sedimentation test, run concurrently with the main test, provides a calibration for the balance and does away with the need for continuing the test until sedimentation is complete. The weight-size distribution is readily calculated, knowing the specific gravity of the powder and the specific gravity and viscosity of the dispersing liquid. **An automatic recording attachment is available, see details on next page.**

DISPERSION OF SAMPLES

For satisfactory performance it is essential to prepare a completely dispersed and homogeneous suspension beforehand. There is no universal dispersing agent for powders. Each powder may require separate treatment to determine the best conditions. A useful feature of the instrument, however, is that because it is not necessary to extract, dry and weigh the settled powder no 'blanks' are required and higher concentrations of the dispersing agents can be used without the necessity of applying correction factors.

Gallenkamp SEDIMENTATION BALANCE

(continued)



PC-650

PC-650

SEDIMENTATION BALANCE, *Gallenkamp*, as specification, for particle size determination, with glassware, water jacket thermometer, mixing tube, plastics dust cover and full instructions for use. Requires, but does not include, a reliable 6V source (see BJ-162 or PC-669 below) ... ... Each **£360·00** *b*

REPLACEMENT PARTS

PC-656	**Sample container,** with 29/32 socket.	Each	**£2·35**	*a*
PC-658	**Stopper,** with 29/32 cone and stopcock.	Each	**£1·20**	*a*
PC-660	**Sedimentation tube,** graduated ...	Each	**£2·90**	*a*
PC-662	**Water jacket,** without gaskets ...	Each	**£1·55**	*a*
PC-663	**Gasket,** top, for PC-662	Each	**£1·60**	*b*
PC-664	**Gasket,** bottom, for PC-662	Each	**£1·60**	*b*
PC-665	**Receiving tank**	Each	**£0·90**	*a*
PC-666	**Torsion wire**	Each	**£7·00**	*b*
PC-667	**Lamp,** 6V, 18W, S.B.C.	Each	**£0·60**	*m*
PC-668	**Mixing tube,** borosilicate glass, with mark at 225 ml and 29/32 socket. Overall length 25 cm with gradual taper to 15 mm dia at lower end for easy transfer of samples into sample container PC-656...	Each	**£1·90**	*a*
TJ-380	**Thermometer** for water jacket, scale span 10 to 40°C For price see entry in List No. sequence.			

ACCESSORIES

PC-669	**Transformer,** 6V, 18 VA, totally enclosed. For 200/250V 50/60 Hz single phase supplies.	Each	**£14·25**	*b*
	For 100/110V 50/60 Hz single phase supplies.	Each	**£15·00**	*bN*

When ordering please state voltage and frequency of supply.

BJ-162 **Accumulator,** 2V, 40 A.h. (three required). For price see entry in List No. sequence.

RECORDING ATTACHMENT FOR SEDIMENTATION BALANCE

This attachment enables the balance to be left unattended once the sequence of operations has been started. Consequently determinations can be made at night as well as during the day. The photographic recording method employed has no effect whatsoever on the delicate torsion balance used to weigh the sedimenting sample. Using a changing bag and a simple developing tank, a permanent set of readings can be produced within 10 minutes of unloading the camera. For this processing a darkroom is unnecessary.

TIMER

The electrical impulses required to operate the recording camera are supplied by this timer. The impulses occur at time intervals which increase in the ratio of $\sqrt{2}:1$, the first impulse occurring after ½ min. When the key switch is moved to the start position, timing commences. The elapsed time in minutes is indicated on the counter, up to a maximum of 512 min from the start, when the last exposure occurs and the timer switches itself off. On resetting the timer, both the timing mechanism and the counter return to the start position ready for the next determination.

The 'camera operation' lamp flashes each time an impulse is transmitted to the camera.

AUTO-CAMERA

This is an automatic camera which is solenoid operated by a 24V d.c. impulse. It will take up to 50 exposures of 25×25 mm format on 35 mm film at each loading. The shutter speed is adjustable from 1/4 to 1/500th of a second and includes bulb. The camera and solenoid are mounted on a bracket which is fitted in place of the eyepiece tube. The existing balance optical system is used to form an image on the graticule in the focal plane of the camera. A hairline just in front of the film provides a reference mark. Film exposure and advance may be carried out independently of the timer. An exposed length of film may be removed from the camera for processing in the reloadable take-up cassette.

PC-682

TIMER, *Gallenkamp*, as specification, for 200/250V 50 Hz single phase supplies only ... ... Each **£184·50** *b*

***PC-684**

AUTO-CAMERA, as specification, with solenoid, cable release and take-up cassette. ... ... Each **£141·50** *f*

For illustrations see page 562.

ACCESSORIES

PC-687	**Changing bag,** black plastics with welded seams.	Each	**£2·25**	*m*
PC-688	**Developing tank,** 35 mm, for up to 1·5 m of film.	Each	**£1·50**	*m*

NOTE: A transformer PC-669 is required to supply the sedimentation balance lamp.

Items on this page normally available from stock except those coded *N*.

PENCILS

PC-910

PENCILS, *Chinagraph*, for writing on glass and other polished surfaces. Available in brown, red, yellow, green, blue, or black In boxes of 12 ... Box **£0·65** *m*

When ordering please state colour required.

A. GALLENKAMP & CO. LTD.

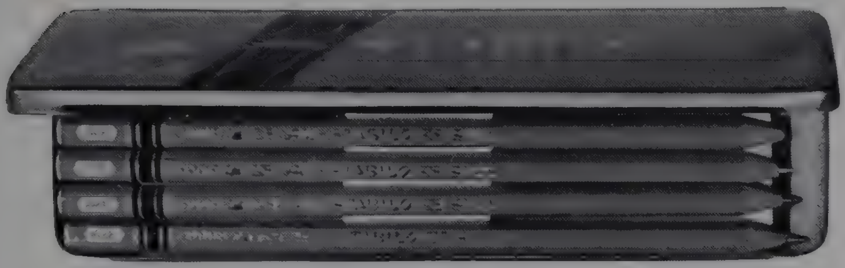
PC-920

PC-920

COLLET HOLDER, *Chinagraph*. This holder will accept *Chinagraph* refills of 4 mm dia. up to 9 cm long and is economical in use as it avoids sharpening and wasted short ends. Holder only with pocket clip. Each **£0·45** *m*

PC-922 **Refills,** *Chinagraph*, for pencil holder PC-920. Available in red, yellow, green, blue or black. In tube of 12 of one colour ... ... Tube **£0·25** *m*

When ordering please state colour required.



PC-940

***PC-940**

PENCIL, *All-Stabilo*, for writing on all surfaces including metal, glass, plastics and glossy paper. The opaque, matt black impression is waterproof but is removed easily by wiping with a damp cloth. In box of 12. Box **£0·75** *m*

***PC-943**

PENCILS, *All-Stabilo*, as PC-940 but coloured. In set of 6 comprising one each red, yellow, blue, green, black and white. In plastics wallet... ... ... Set **£0·50** *m*

PC-982

TEMPERATURE INDICATING THERMOCHROM PENCILS

These pencils provide a ready means of determination of surface temperature of hot objects. If a mark made with one of the crayons on a hot surface changes colour within 1–2 seconds then the temperature is within ±5degC of that particular crayon. An instantaneous colour change indicates a higher temperature, a slower change a lower temperature. The approx. temperature of any surface can be quickly found by successive trials of several crayons. Alternatively an article being heated to a required temperature can be tested intermittently with the appropriate crayon until the colour change takes place in 1–2 seconds.

Temperature of change °C= Code No.	Original colour	Final colour
65	White	Light blue
75	White	Light green
100	Light beige	Blue
120	White	Light green
150	Ivory	Mauve
175	Mauve	Blue
200	Blue	Black
220	White	Light brown
280	Light green	Black
300	Light green	Mid-green
320	Green	White
350	Light brown	Mid-brown
375	Fawn	Black
420	White	Light brown
450	Light pink	Black
500	Beige	Black
600	Blue	White
670	Green	White

***PC-980**

PENCIL, *Thermochrom*, as specification.
12 **£4·40** Each **£0·43** *f*

***PC-982**

PENCILS, *Thermochrom*, as specification. Six pencils in any combination of temperature codes, packed in neat pocket case ... ... Set **£2·84** *f*

When ordering PC-980 or PC-982 please state temperature code Nos.

***PC-984**

PENCILS, *Thermochrom*, as specification. Set of eighteen pencils covering complete range 65 to 670°C, with holder and instructions in work box. Set **£5·80** *f*

GP-225

GLASS WRITING DIAMOND.

GP-230

GLASS WRITING DIAMOND.

For details and prices see entries in List No. sequence.

PENETROMETERS see PETROLEUM
PESTLES see MORTARS and PESTLES
PETRI DISHES see CULTURE

All items on this page, normally available from stock.

PETROLEUM AND ALLIED PRODUCTS TESTING APPARATUS

This section mainly contains apparatus specified in Standard Methods for Testing Petroleum and its Products published by the Institute of Petroleum (IP). References to American Society for Testing Materials (ASTM) methods are made where the apparatus conforms to both specifications, but in many instances the American specification is different if only in minor details and apparatus has to be manufactured specially. References are made also to various standards published by the British Standards Institution (BS) and Standard Tar Products Test Committee (STPTC) where these apply.

Apparatus supplied to a recognised standard will conform to the latest version of the standard, irrespective of our present catalogue specification. This policy will be adhered to rigidly unless we are definitely instructed to the contrary when apparatus is ordered. In order to give the user the benefit of modern trends in design affecting only details which are not included in the standard, we also reserve the right to depart from catalogue specifications by incorporating improvements which increase the convenience and usefulness of apparatus.

STANDARD METHODS

Listing code
IP 13—D 189 indicates **ASTM—IP** joint methods.
IP 34 D 93 indicates technically equivalent methods.
IP 45 (D 6) indicates corresponding methods.

IP No.	ASTM No.	TITLE	PAGE
IP 2	(D 611) (D 1012)	Aniline point	567
IP 10	(D 187)	Burning test—24 hour	568
IP 12	(D 240)	Calorific value of liquid fuel ...	569
IP 13	— D 189	Conradson carbon residue ...	568
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IP 131	— D 381	Existent gum in fuels	588
IP 132	— D 566	Dropping point of lubricating grease	577
IP 138	— D 873	Oxidation stability of aviation fuels	585
IP 143		Asphaltenes	567
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IP 167		Penetration of semi-fluid greases	586
IP 170		Flash point by the Abel apparatus	579
IP 179	— D 937	Cone penetration of petrolatum	586
IP 182		Acidity (inorganic) of petroleum products	591
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V 4e	Separating funnel receivers ...	588
V12	Hubbard specific gravity bottle ...	588
V 14	Pyknometer	588

BS No.	TITLE	
148	Insulating oil	578
188	Viscosity of liquids	592
434	Bitumen road emulsion	594
598	Bituminous mixtures	567
658	Distillation range	576
756	Dean and Stark apparatus ...	596
894	Ubbelohde apparatus	577

ANILINE POINT, IP 2 Method D and ASTM D611

PE-100

U-TUBE, borosilicate glass, with cross tube, diameter 16 mm, height 125 mm, approximately... Each **£1·50** *a*

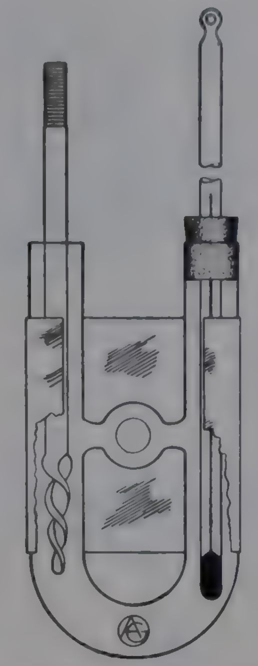
PE-102

SHIELD, metal to fit U-tube, with 10 mm aperture. Each **£0·90** *a*

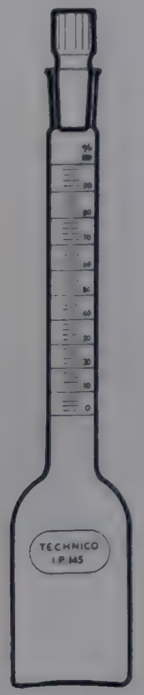
PE-104

STIRRING ROTOR, glass, auger shaped. Each **£0·45** *a*

SS-530	**Stirrer,** *Gallenkamp*...	For details and prcies see entries in List No. sequence.
TK-531	**Thermometer,** IP 20C, Aniline Point Low	
TK-533	**Thermometer,** IP 21C, Aniline High	



PE-100 with PE-102, PE-104 and thermometer



PE-120

BITUMEN CONTENT. IP 162 Funnel Method and BS 598 PART 3 Method A.

Assembly comprising components listed below.

COMPONENTS

PE-107	**Beaker,** aluminium, 600 ml, with aluminium cover.	Each	**£0·70**	*c*
PE-108	**Funnel,** glass, 20 cm dia. top edge ground flat.	Each	**£0·80**	*a*
PE-109	**Plate,** glass, 22·5 cm dia. with 16 mm hole at centre.	Each	**£0·50**	*c*

FP-240	**Funnel,** glass, 10 cm diameter ...	For prices see entries in List No. sequence.
RT-200	**Stirring rod,** glass	
BT-180	**Bottle,** Winchester pattern, 2500 ml	

OLEFINIC PLUS AROMATIC HYDROCARBONS IN PETROLEUM DISTILLATES, ASTM D1019-IP 145

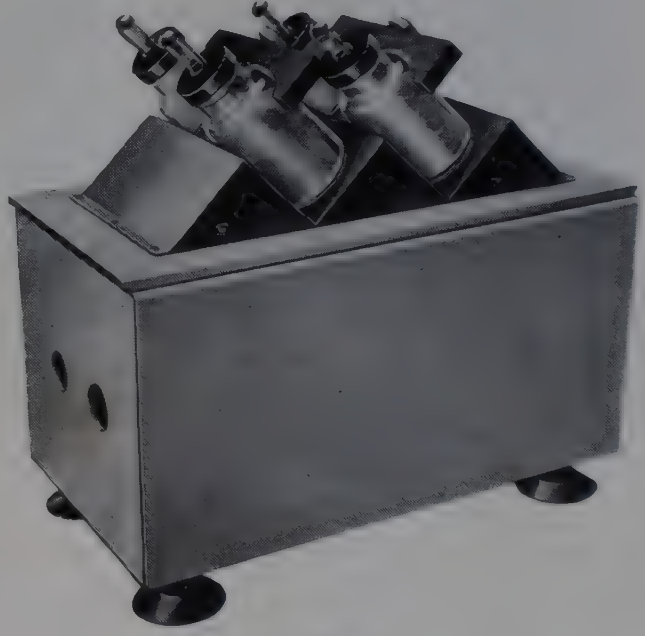
PE-120

SULPHONATION FLASK, *Technico*, standard, with ground stopper, capacity to zero graduation about 45 ml, neck graduated 0–100% in 2% divisions. Each **£1·55** *a*

PE-124

SHAKING MACHINE, accommodates four standard sulphonation flasks in individual cooling jars. Flasks are mounted at an angle of 45° and shaken at 250 ±25 cycles/min with a horizontal stroke of approximately 7·5 cm. Supplied with four screw top cooling jars but **without sulphonation flasks.** For 240/250V 50 Hz single phase supplies ... ... Each **£120·00** *fN*

PH-900 **Centrifuge,** for sulphonation flasks. For details and price see entry in List No. sequence.



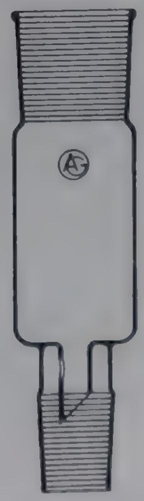
PE-124

ASPHALTENES—PRECIPITATION WITH NORMAL HEPTANE, IP 143

PE-140

EXTRACTOR, Ⓐ, borosilicate glass, with 24/29 cone and 34/35 socket ... Ten **£14·60** Each **£1·65** *a*

BH-030	**Basin,** evaporating, capacity 100 ml	For details and prices see entries in List No. sequence.
FJ-058	**Flask,** conical, borosilicate glass, 250 ml	
Q-CX5/25	**Condenser, Davies,** double surface, borosilicate glass, 20 cm jacket, with 34/35 cone	

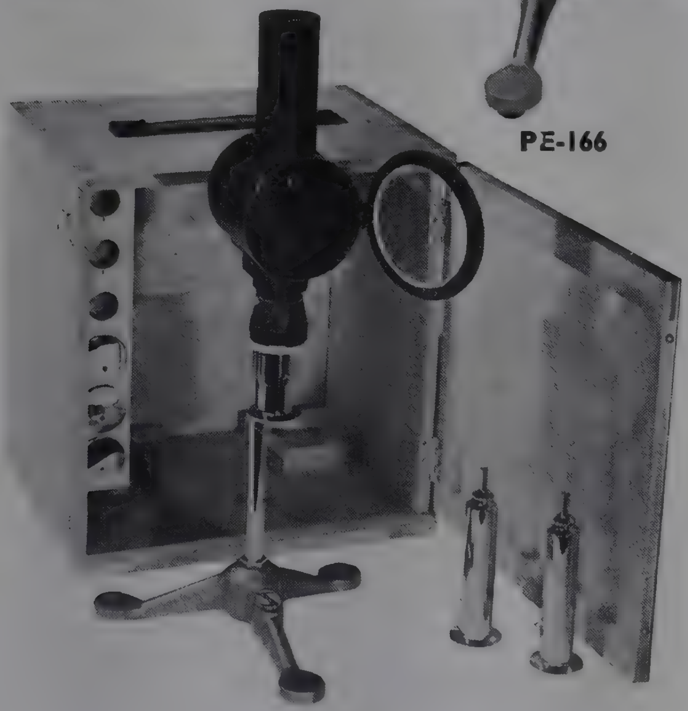


PE-140

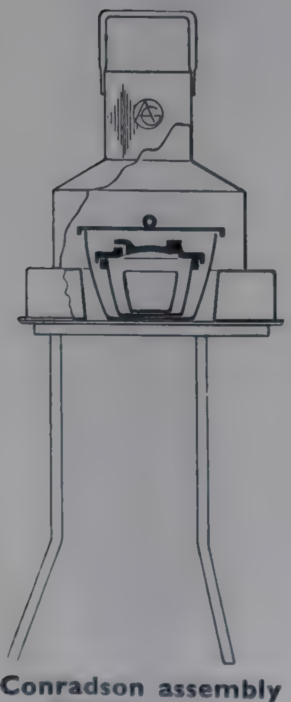
Items on this page normally available from stock except those coded *N*.

PE-160

PE-166



PE-170
PE-172



Conradson assembly
PE-200 et seq.

BURNING TEST—24 HOUR, IP 10 and ASTM D187

PE-160

STANDARD LAMP, *Seta*, complete with two borosilicate glass chimneys and a pack of 10 wicks. Each **£12·00** *f*

REPLACEMENT PARTS

PE-162	**Chimney,** borosilicate glass	Pack of 3	**£2·00**	*f*
PE-164	**Wicks**	Pack of 10	**£1·00**	*f*

ACCESSORY

PE-166	**Flame gauge,** for use in conjunction with lamp PE-160.	Each	**£40·00**	*f*

SMOKE POINT OF JET FUELS ASTM D1322 SMOKE POINT, IP 57

PE-170

STANDARD LAMP, *Seta*, comprising lamp body, candle socket, candle, on stable tripod stand. The lamp body, enamelled matt black, has a polished black scale marked in white. The candle socket has a smooth height adjustment ... ... Each **£45·00** *f*

PE-172

CASE, to contain lamp assembly, tripod stand and five additional candles ... ... Each **£9·50** *f*

REPLACEMENT PARTS

PE-174	**Candle**	Each	**£15·00**	*f*
PE-176	**Wick**	Pack of 50	**£1·05**	*cS*

CONRADSON CARBON RESIDUE OF PETROLEUM PRODUCTS ASTM D189-IP 13, STPTC C08

Assembly comprising components listed below:

COMPONENTS

PE-200	**Hood,** spun steel	Each	**£2·75**	*fS*
PE-202	**Insulator,** hollow steel box	Each	**£5·00**	*fS*
PE-206	**Crucible, Skidmore, with cover,** cast iron, diameter 55 mm, height 38 mm	Each	**£2·25**	*fS*
PE-208	**Wire triangle,** nickel chromium, 6·3 cm side.	Each	**£0·90**	*fS*
BX-045	**Meker burner,** diameter of flame 25 mm	For details and prices see entries in List No. sequence.		
CW-210	**Crucible,** *Royal Worcester* porcelain, size 1 shape A, diameter 49 mm, capacity 28 ml			
CW-360	**Crucible,** sheet iron, with cover, size 80 × 60 mm			
GR-100	**Glass balls,** diameter about 3 mm			
SM-915	**Tripod stand,** height 20 cm, diameter 12·5 cm			

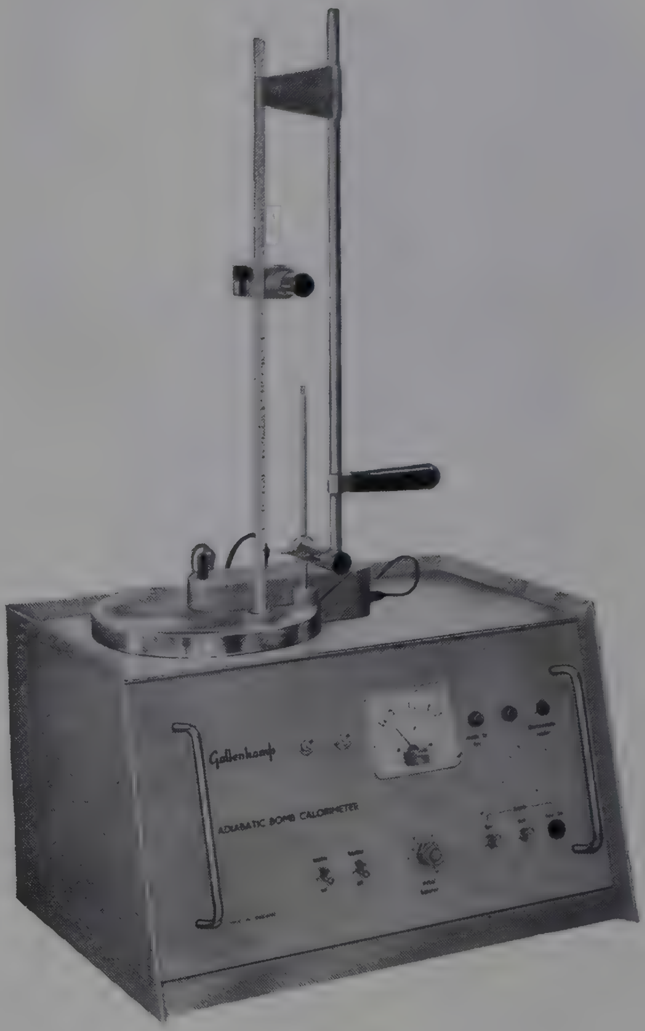
Items on this page coded *S* normally available from stock.

Gallenkamp AUTOBOMB

CALORIFIC VALUE OF LIQUID FUEL—BOMB CALORIMETER METHOD, IP 12.
ASTM D240, ASTM D2382, DIN 51785.

- Top cover assembly on telescopic lift—no dismantling between tests.
- No handling of calorimeter thermometer—risk of breakage negligible.
- Instantaneous heating for accurate response.
- High speed water circulation through jacket and cover for temperature uniformity.
- Console encloses calorimeter and all control circuits, cables and water connections.
- Firing wire continuity tester circuits give visual indication of successful firing. Remote firing facility.
- Swing down control panel for immediate access for servicing.
- Printed circuit for reliability.
- Includes exclusive illuminated reader/vibrator for thermometer.

For full details see CB-100 to CB-353 in List No. sequence.



CB-100

RAMSBOTTOM CARBON RESIDUE OF PETROLEUM PRODUCTS
ASTM D524 - IP 14

PE-220

HEATING BLOCK, electrically heated, with accurate temperature control. Comprises a solid cylindrical metal block with six wells. The block is heated by elements clamped to the outside and mounted in a well lagged case. A built-in indicating temperature controller operates from a thermocouple in the block. For 240V a.c. single phase supplies ... ... Each **£250·00** *f*

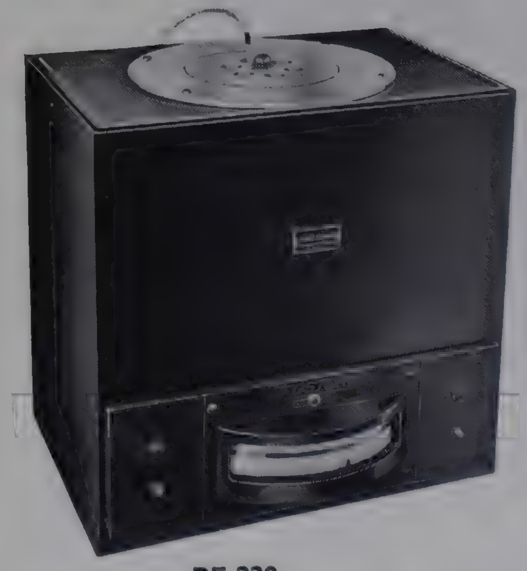
When ordering please state voltage and frequency of supply.

REPLACEMENT PART

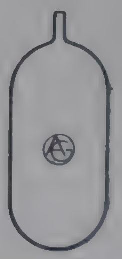
PE-222 Control bulb, with thermocouple but without pyrometer ... ... Each **£12·50** *f*

PE-230

COKING BULB, (AG), borosilicate glass, to ASTM D 524-IP 14. In pack of 12. 10 packs **£24·00** Pack **£2·70** *aS*

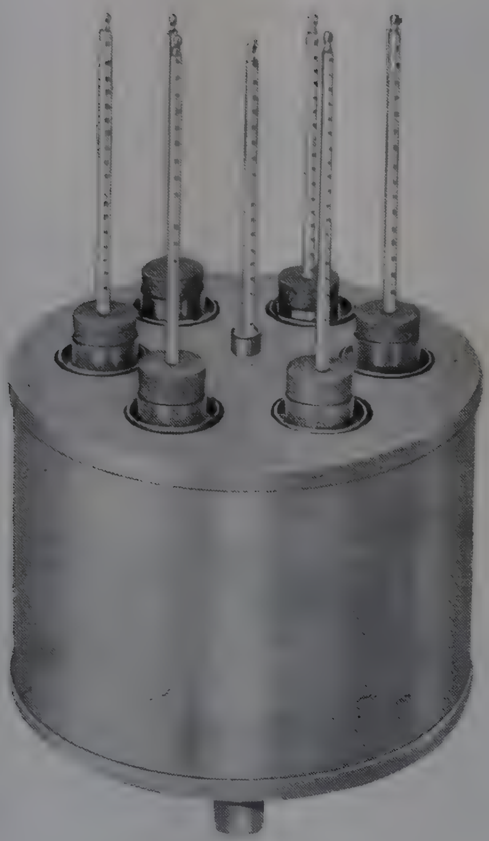


PE-220



PE-230

Items on this page coded *S* normally available from stock.



PE-254

POUR POINT, ASTM D97 - IP 15

CLOUD POINT OF PETROLEUM OILS, ASTM D 2500 - IP 219

PE-254

CLOUD AND POUR POINTS BATH, 6-test, comprising cylindrical copper tank, 23 cm diameter, depth 16·5 cm, on three feet, with loose copper cover fitted with six pockets and cork disks to take standard test jars, and central thermometer tubulure. **Without test jars, gaskets or thermometers**... Each **£38·00** *b*

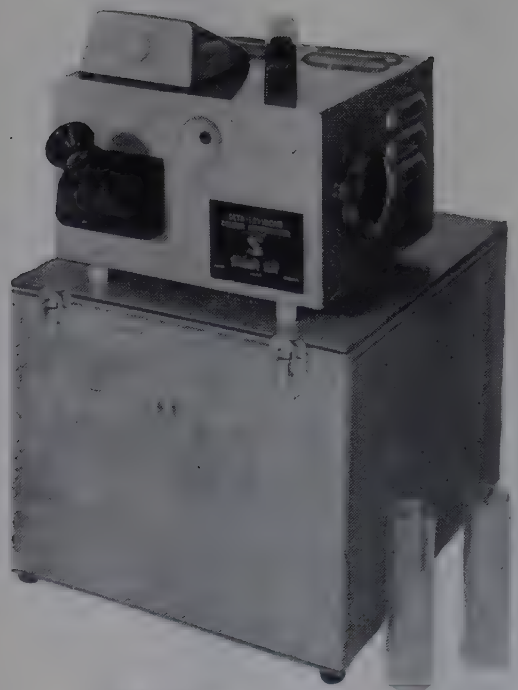
ACCESSORIES AND REPLACEMENT PART

PE-260	**Test jar,** borosilicate glass, internal diameter 32 mm, overall length 120 mm, with marks at 51 mm and 57 mm from the bottom, fitted with cork.	Ten £3·00 Each	£0·36	*a*
PE-262	**Cork ring gasket,** for test jar ...	Pack of 10	£0·25	*c*
PE-264	**Cork disks,** spare, for bottom of test bath pockets.	Pack of 10	£0·40	*c*
TK-502	**Thermometer,** IP 1F Cloud and Pour	For full details and prices see entries in List No. sequence.		
TK-503	**Thermometer,** IP 1C Cloud and Pour			
TK-504	**Thermometer,** IP 2F Cloud and Pour			
TK-505	**Thermometer,** IP 2C Cloud and Pour			

MULTIPLE TEST REFRIGERATED CLOUD AND POUR POINT EQUIPMENT

Comprises three independently controlled baths each with six sleeves for Cloud and Pour Point test jars. The baths operate at 30 to 35°F, 0 to +5degF and —25 to —35°F respectively.

Details and prices on application.



PE-340 with test jars

ASTM COLOUR OF PETROLEUM PRODUCTS ASTM D1500-IP 196

PE-340

COLOUR COMPARATOR, *Seta-Lovibond,* for determining the colour of a wide variety of petroleum products such as lubricating oils, diesel oils and petroleum waxes. The metal housing contains a light source with daylight and opal filters, and front mounted angled optical eyepiece which splits the field of view into two sections, one accepting light transmitted by the sample and the other light passed by the colour standards. Sixteen colour standards are mounted in a rotating turret, and the reference number of the standard viewed appears in an illuminated window near the eyepiece. Supplied complete with case which acts as a stand for the comparator.

Without test jars ... ... Each **£140·00** *fN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

PE-343	**Sample container,** for referee work ...	Each	£0·50	*fN*
PE-260	**Cloud and Pour test jar,** for routine work. For full details and price see entry in List No. sequence.			

REPLACEMENT PART

PE-346	**Lamp,** colour temperature 2750°K ...	Each	£0·13	*fN*

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

DETECTION OF COPPER CORROSION FROM PETROLEUM PRODUCTS BY THE COPPER STRIP TARNISH TEST, ASTM D130-IP 154

PE-360

LOW PRESSURE BOMB, *Seta,* for pressures up to 100 lbf/in², internal diameter 32 mm, internal height 184 mm ... ... Each **£18·00** *fN*

REPLACEMENT PART

PE-362 **'O' ring seal** ... ... Pack of 10 **£1·25** *N*

PE-366

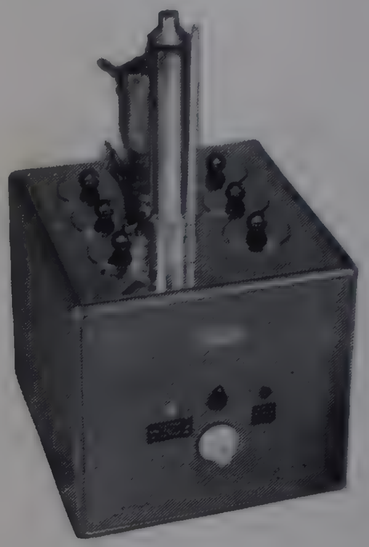
DUAL PURPOSE WATER BATH, *Seta,* comprises tank to hold 6 bombs or 18 test tubes, surrounded by an enamelled case, adjustable thermostat, immersion heater, stirrer and condenser. The switching system allows for either boiling or control at 122°F, the condenser preventing excessive loss of water. Six covers with support hooks locate in the chromium plated top. For 200/250V 50 Hz single phase supplies ... Each **£125·00** *fN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

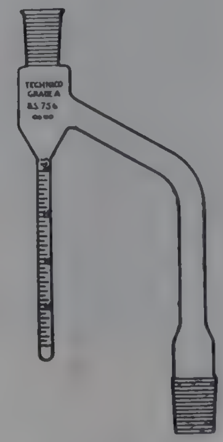
PE-371	**Copper strip vice,** for five strips ...	Each	**£15·00**	*fN*
PE-372	**Flat test tube,** for examining copper strips, pack of ten.	Pack	**£5·75**	*f*
PE-376	**Copper strips,** 3 in. long, ½ in, wide, 3/32 in thick, pack of ten...	Pack	**£2·00**	*f*
TF-180	**Test tube, borosilicate glass,** 24 mm diameter, 150 mm long	For full details and prices see entries in List No. sequence.		
TK-616	**Thermometer,** 1P 64F, Specific Gravity, wide range			
TK-617	**Thermometer,** IP 64C, Density, wide range			

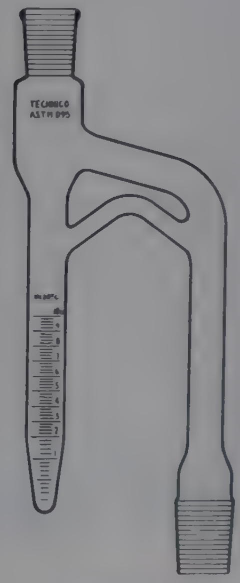
PE-360


PE-366

CORROSIVE SUBSTANCES IN GREASE COPPER STRIP TEST IP 112

BJ-625	**Beaker,** 100 ml, tall form	For details and prices see entries in List No. sequence.
PE-371	**Copper strip vice,** for five strips...	
PE-376	**Copper strips**	


WJ-150


WJ-175

DEAN AND STARK APPARATUS IP 74 and ASTM D95

See WJ-130 to WJ-230 in List No. sequence.

DILUTION OF GASOLINE ENGINE CRANKCASE OILS ASTM D322 IP 23

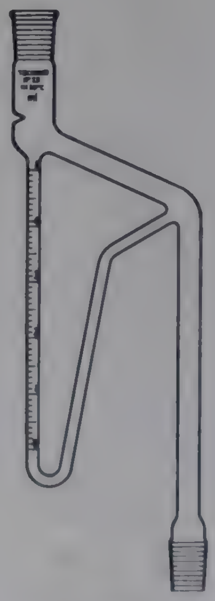
PE-550

CONDENSER, Liebig, borosilicate glass, 40 cm, with 24/29 cone ... ... Ten **£12·60** Each **£1·40** *a*

PE-552

DILUENT TRAP, *Technico,* 5 cm³ subdivided in 0·1 cm³, with 24/29 cone and socket. Ten **£26·00** Each **£2·90** *a*

Q-FRIL/3S FLASK, 1000 ml, short neck with 24/29 socket. For price and details see QUICKFIT APPARATUS.


PE-552

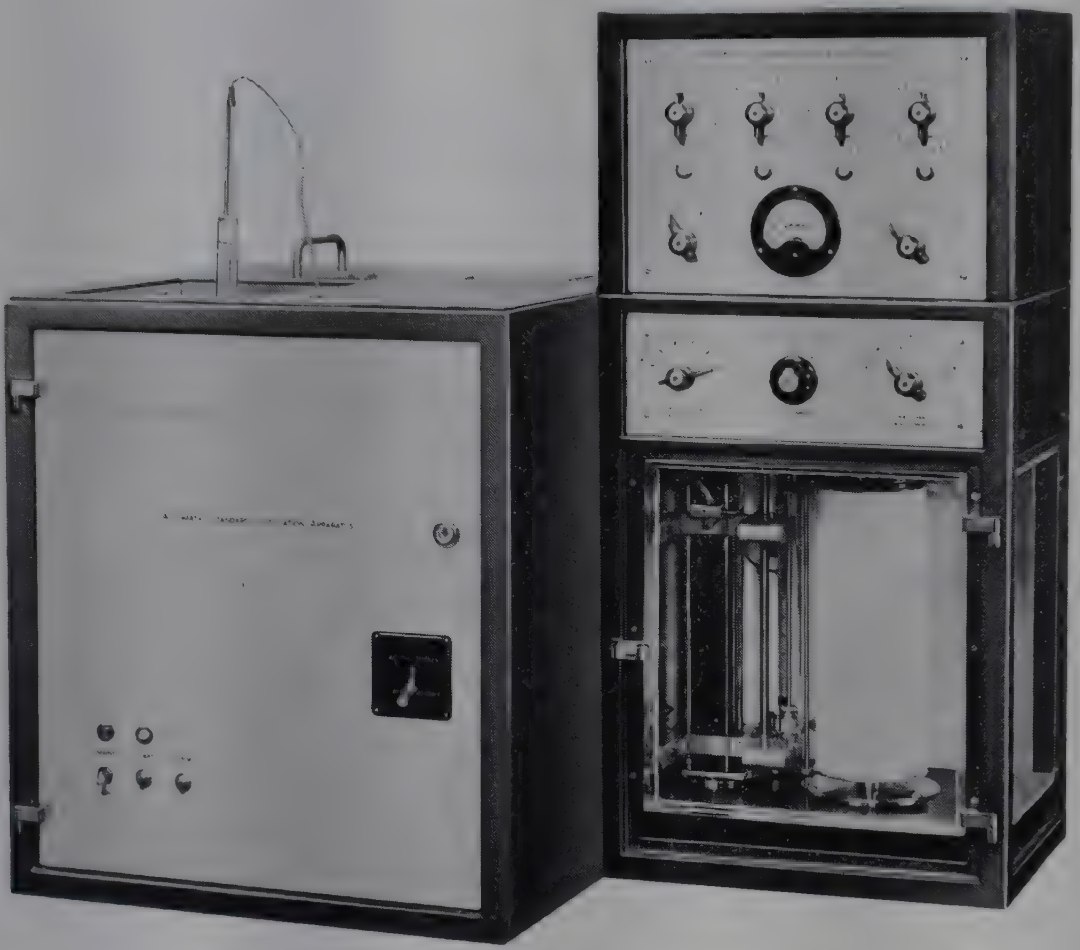
Items on this page normally available from stock except those coded *N.*

Gallenkamp ASDA
REGD. TRADE MARK

AUTOMATIC STANDARD DISTILLATION APPARATUS

AN ALL-MAINS ROBOT WHICH AUTOMATICALLY PERFORMS STANDARD DISTILLATION TESTS

(Developed in collaboration with Shell Refining Co. Ltd., Stanlow)



PE-700

- **Routine testing of solvents, gasolines, aviation and motor fuels, gas oils, fuel oils, etc. with boiling vapour temperatures up to 400°C (760°F)**
- **Suitable for Joint standard methods ASTM D86-IP 123, Groups 1, 2, 3 and 4, also IP 195, ASTM D1078, DIN 51751 and DIN 51752**
- **Accuracy and reproducibility are well within the limits specified**
- **Operator fatigue and personal errors are eliminated**
- **Designed for continuous operation over extended periods**

Distillation tests when carried out manually are both lengthy and tedious, and consequently are less reliable in practice than the methods themselves might indicate.

Asda carries out the tests automatically: it is, in short, a robot which, having been correctly programmed for a particular product, will faithfully carry out the standard test and give all the required test data.

The components and materials of *Asda* are carefully selected to ensure the required high standards of reliability and performance. Measurement of vapour temperature is by a thermocouple of dynamic characteristics equivalent to those of a mercury-in-glass thermometer under test conditions. Instrument heat is dispersed by an internal ventilating fan. All inter-connections between electrical assemblies are by multi-pin plugs and sockets with long leads to facilitate servicing. The assemblies themselves are standard and therefore interchangeable for replacement purposes. A hinged control unit cover enables examination of the electrical components without interrupting or delaying a distillation.

Test data include:

- Correction temperature
- Initial boiling temperature
- Time taken to reach initial boiling point
- Vapour temperature/volume recovery curve
- Time from initial boiling point to final heat adjustment
- Final boiling point (end point)
- Time taken to reach final boiling point
- Total percentage volume recovered

A feature of the apparatus is the continuous and accurate control of the distillation at the specified volume per unit time by monitoring the rate of rise of the distillate meniscus and adjusting the flask heater voltage accordingly. This is an operation very difficult to achieve manually without considerable experience.

***Asdas* have already been supplied to about 150 refineries all over the world, and in one laboratory alone, 80,000 tests were made in 8 months on a bank of fifteen *Asdas*.** The preliminary charging and instruction of the instrument are completed in a few simple and rapid operations. Then the instrument takes over completely and produces all the test data called for by the standard methods to the accuracies specified. One operator can simultaneously supervise a number of separate *Asdas*.

Gallenkamp ASDA

REGD. TRADE MARK

(continued)

OPERATION

The apparatus is charged and programmed, the START switch is depressed and the standard test then proceeds automatically. The heater is switched on and, after two minutes, the pen is momentarily placed on the chart to record Correction Temperature. After five minutes the heat is, for products other than gas oils, reduced by a preselected fraction to avoid boiling over. When the first drop of distillate leaves the condenser tube, the receiver moves against the tip of the condenser and the pen records Initial Boiling Point on the chart. Thereafter, as distillation proceeds, a continuous curve is produced on the chart of temperature against volume recovered. (The standard temperature recorder supplied has dual ranges 0–300°C (32–580°F) and 0–400°C (32–760°F). An alternative Narrow Temperature Range Adapter is listed for testing narrow boiling range products).

The rate of recovery is controlled at 4·5 cm^3/min using a 100 cm^3 receiver, by means of a master timing-motor which, through suitable gearing, controls the input of the heater. Towards the end of the test a final heat adjustment occurs at a preselected volume recovery. When Final Boiling Point is reached, the heater switches off and, after a drainage period, the pen leaves the chart and returns to its zero position. The distillation is now complete, and an internal air blower is automatically switched on to cool the heater compartment for the next run. A facility socket is provided for use at this stage to sound an end-of-test alarm.

A device is incorporated to prevent the subsequent test being started until the heat input is returned to zero and another to prevent hesitation points prematurely ending the test.

The condenser bath when heated can be controlled thermostatically at any selected temperature between 20° and 100°C. A refrigerator is available for tests requiring bath temperatures below ambient.

TEST SELECTION

Two switches on the front of the apparatus are used to determine the cycle of operations appropriate to each test:—

Select test switch

Position 1—ASTM D86–IP 123 Groups 1, 2 and 3, and D1078, IP 195, and DIN 51751 and 51752.

Position 2—ASTM D86–IP 123 Group 4.

Position 3—Rapid distillation (non standard).

NOTE: Position 3 provides facility for a rapid test by omitting heater control which is not essential in the distillation of narrow boiling range fractions. Tests may then be completed in as little as 20 minutes.

Stop test switch

This provides choice of four alternative terminations of test:—

1. Final boiling point.
2. Dry point (used only when dry point detector is incorporated).
3. Preselected temperature.
4. Preselected recovery.

SITE REQUIREMENTS, COOLING AND SERVICES

The *Asda* should be sited on a firm level bench (or floor, in the case of refrigerator or trolley mounted instruments). Electrical supply voltage must not vary by more than ±10% of the stated value. Ambient temperature must not exceed 20°C (68°F) unless the refrigerator is used, in which case the ambient temperature must be below 35°C (95°F). See also **Refrigerator** under ACCESSORIES.

In locations of high ambients the instrument should preferably be used in an air-conditioned room. Where this is not possible, a **Receiver Compartment Cooler** is available to maintain a constant temperature in the receiver compartment. This accessory can be supplied with coolant from the refrigerator, be connected to a cooling water supply of a suitable temperature, or water from the condenser bath may be circulated to it by means of a pump.

When bench mounted, the apparatus occupies an area of 100 × 65 cm. Alternatively it may be mounted on trolley PE-703. Rear access is required for servicing.

Electricity

Voltage:	100/125V or 200/250V a.c. mains
Frequency:	50 or 60 Hz
Power:	*Asda* 2·5 kW (including accessories) Refrigerator 4·5 kW starting 900W running

NOTE: Should mains supply voltage fluctuate by more than ±10% a constant voltage transformer may be required.

Water

A supply of cooling water not above 10°C and a drain are required for the condenser bath, **except when a refrigerator is included in the apparatus set.**

INSTALLATION

The performance of *Asda* depends on the instrument being correctly installed and on local personnel being familiar with operating and maintenance procedures.

It is strongly recommended that a *Gallenkamp* engineer (or one, if available, from our Distributor) **install the *Asda* and instruct the personnel responsible for operating and maintenance.** Because installation of *Asda* may be required in any part of the world, the engineer's time and travelling expenses may vary substantially from site to site. This precludes these charges from being included in the List price of the instrument.

We will therefore on request submit a quotation for installation and instruction of personnel when the ultimate destination of the instrument is known.

MAINTENANCE

When ordering, users are recommended to include and hold on site at least the stand-by spares kit PE-726 and test instruments EE-840 and EF-628.

Gallenkamp ASDA

REGD. TRADE MARK

(continued)

ACCESSORIES

PE-750

DIMENSIONS AND WEIGHTS

ASDA

Overall dimensions	94×66×86 cm
Net weight	141 kg

Refrigerator

Overall dimensions	97×66×84 cm
Net weight	126 kg

REFRIGERATOR

To meet standard test specifications the temperatures of the condenser bath and receiver compartment must be controlled within certain limits. It is also necessary to restrict the temperature of the latter to 25°C for the photocells to function satisfactorily. The *Asda* refrigerator satisfies these conditions as well as providing cooled storage for samples. It has sufficient capacity for two *Asdas* in ambient temperatures up to 27°C or one *Asda* in ambients up to 35°C. Since the load on the refrigerator varies with the type of product being tested, it is sometimes possible to cool two *Asdas* using one refrigerator in ambient temperatures above 27°C. For example, if one *Asda* is to be used for gasolines and the other for gas oils (for which the bath is not continuously cooled), then one refrigerator will be sufficient for ambients up to 35°C.

The refrigerator cools a tank containing ethylene glycol solution which is pumped by an electric immersion pump (having a brushless, sealed-bearing a.c. motor) to the bath and receiver compartment of the *Asda*.

Heat is removed from the receiver compartment by means of the receiver compartment cooler, which receives coolant from the refrigerator. The cooler is a heat exchanger and air blower combined, the temperature of the receiver compartment being controlled by a hydraulic thermostat. The cooler replaces the standard rear panel of the receiver compartment. Hoses carrying the coolant are of plastics encased in cellular rubber.

DRY POINT DETECTOR

A plug-in photoelectric device for monitoring the base of the flask to terminate the test at the Dry Point specified in ASTM D86-IP 123, ASTM D1078 and IP 195.

A beam of light from a lamp underneath the heater compartment passes through the flask to a photocell. During the distillation, while liquid remains in the flask, the light beam is deflected away from the photocell. When the Dry Point is reached, the light path is unobstructed and light falls on the photocell, a relay is energised and the test is terminated.

NARROW TEMPERATURE RANGE ADAPTER

A plug-in replacement for the normal thermocouple potentiometer panel gives full chart temperature spans of 10degC, 15degC or 30degC. This is essential where boiling ranges are narrow, as in the case of SBPs or pure solvents, where, for example, deviations of less than 1degC are significant. Instead of a thermocouple, the sensing element is a platinum resistance thermometer used as one arm of a Wheatstone bridge; this system is responsive to rapid temperature changes. The unit is available with up to ten specified ranges.

Gallenkamp ASDA
REGD. TRADE MARK

(continued)

PE-700

AUTOMATIC STANDARD DISTILLATION APPARATUS, *Asda, Gallenkamp,* as specification, including tool kit PE-780 and instructions for assembly, operation and maintenance, **but not including flasks, receivers, charts and heater boards.** For 100/125V and 200/250V 50 or 60 Hz single phase supplies with earthed (grounded) neutral ... ... Each **£2110·00** *gN*

For details of recommended installation procedure see page 573.

(Packing and carriage extra outside the U.K.)

When ordering please state voltage and frequency of supply.

PE-703

TROLLEY, for floor mounting one *Asda.* Comprises tubular steel frame on castors ... ... Each **£23·50** *gN*

PE-708

WORKING KIT of flasks, receivers, charts and heater boards for initial operation, comprises twelve 125 ml flasks PE-797, six 100 ml receivers PE-710, one set of heater boards PE-714, 500 charts 0–300°C PE-718 or 32–580°F PE-722: **(please state which are required),** and 500 charts 0–400°C PE-720 or 32–760°F PE-724: **(please state which are required).**

Pack **£40·00** *g*

COMPONENTS

PE-710	**Receiver,** 100 ml.	Ten	**£31·00**	Each	**£3·50**	*g*
PE-712	**Thermocouple** ...	Ten	**£55·00**	Each	**£6·20**	*g*
PE-714	**Asbestos boards,** 150×150 mm with centre and fixing holes.					

Dia. of hole	32	38	50 mm	
Ten	**£3·30**	**3·30**	**3·30**	*g*
Each	**£0·39**	**0·39**	**0·39**	

PE-716	**Heater assembly**			Each	**£9·50**	*g*
PE-717	**Heater element,** replacement for PE-716.			Each	**£0·80**	*g*
PE-718	**Charts,** range 0–300°C.	10 boxes	**£12·40**	Box of 100	**£1·40**	*g*
PE-720	**Charts,** range 0–400°C.	10 boxes	**£12·40**	Box of 100	**£1·40**	*g*
PE-722	**Charts,** range 32–580°F.	10 boxes	**£12·40**	Box of 100	**£1·40**	*g*
PE-724	**Charts,** range 32–760°F.	10 boxes	**£12·40**	Box of 100	**£1·40**	*g*
PE-797	**Flask,** 125 ml to ASTM D86—IP 123 and ASTM E133. For price see entry in List No. sequence.					

PE-726

STAND-BY SPARES KIT, recommended, comprises one heater element, one thermocouple, one *Variac* contact, one slidewire contact, three 240V relays, one 48V relay, two mains indicator lamps, two exciter lamps, two indicator lamps, one photocell, three 1A fuselinks, three 7·5A fuselinks ... ... Kit **£18·50** *m*

Recommended test instruments

EE-840	**Multirange meter,** for general servicing and setting photocell currents...	For details and prices see entries in List No. sequence.
EF-628	**Potentiometer,** for calibrating temperature recorder	

PE-730

NARROW TEMPERATURE RANGE ADAPTER, as specification on previous page with **calibrated ranges which must be specified when ordering.** Supplied with one platinum resistance thermometer but **without charts.**

Total No. of ranges	1 to 6	7 to 10
Each	**£160·00**	**244·00** *gN*

ACCESSORIES

PE-732	**Platinum resistance thermometer, spare,** for use with PE-730	Each	**£9·50**	*gN*
PE-733	**Charts,** narrow range, 10degC span, for use with PE-730.	Box of 100	**£1·60**	*g*
PE-734	**Charts,** narrow range, 15degC and 30degC span, for use with PE-730	Box of 100	**£1·70**	*g*

PE-736

DRY POINT DETECTOR, as specification on previous page. Comprises lamp housing and photocell operated relay ... ... Each **£85·50** *gN*

ACCESSORY

PE-797	**Flask,** 125 ml, to ASTM E133 and ASTM D86-IP 123. For price see entry in List No. sequence.
PE-798	**Flask,** 200 ml, to ASTM E133, ASTM D1078 and IP 195. For price see entry in List No. sequence.

PE-750

REFRIGERATOR, for two *Asdas,* as specification on previous page. Complete with two receiver compartment coolers, coolant couplings and one charge of coolant. Each **£655·00** *gN*

PE-751

REFRIGERATOR, for one *Asda,* as specification on previous page. With one receiver compartment cooler, coolant couplings and one charge of coolant. Each **£560·00** *gN*

ACCESSORY

PE-753	**Receiver compartment cooler,** with coolant hoses, to convert PE-751 to PE-750 for working a second *Asda.*	Each	**£95·00**	*gN*

PE-754

RECEIVER COMPARTMENT COOLER, as PE-753 but without hoses, for use with cooling water supplies. Each **£89·00** *gN*

ACCESSORIES

WM-080	**Water pump,** electrically driven for circulating iced water from the condenser bath through the receiver compartment cooler. For price see entry in List No. sequence. Requires but does not include adapter PE-755.			
PE-755	**Adapter,** for WM-080	Each	**£3·50**	*g*

When ordering PE-750 to PE-754 please state voltage and frequency of supply.

PE-775

INSTRUCTIONS MANUAL, additional copy. Each **£1·75** *b*

PE-780

MAINTENANCE KIT, for *Asda,* comprising hexagon key set, open end spanner set, tubular spanner set, screwdriver, slidewire contact key, lubricating oil, anti-scuffing paste, *Kilopoise* grease, *Electrolube,* and bag of assorted screws, nuts and washers ... Kit **£4·50** *m*

Items on this page normally available from stock except those coded *N.*

DISTILLATION OF CRUDE PETROLEUM— PRELIMINARY DISTILLATION, IP 24

DISTILLATION OF PETROLEUM PRODUCTS ASTM D86-IP 123

DISTILLATION OF NATURAL GASOLINE ASTM D216 - IP 191

DISTILLATION RANGE OF VOLATILE ORGANIC LIQUIDS IP 195, ASTM D1078

DETERMINATION OF DISTILLATION RANGE, BS 658

PE-783

PE-783

SHIELD, for gas heating. Stove enamelled and lined internally with asbestos. Supplied with asbestos shelf with 10 cm hole and three 15 cm square asbestos boards with 32 mm, 38 mm and 50 mm holes, respectively. **Without burner**... ... ... Each **£18·50** *fN*

REPLACEMENT PARTS

PE-784 **Asbestos boards,** 15 cm square with centre hole.

Diam. of hole	32	38	50 mm	
Each	£0·35	0·35	0·35	*f*

ACCESSORIES

BX-075 Burner, coal gas.
BX-275 Burner, methane.
BX-420 Burner, LPG.

For prices and details see entries in List No. sequence.

PE-786 with PE-791

PE-786

SHIELD, as PE-783 but electrically heated by adjustable radiant type element. The heater is controlled by a variable transformer with an ON/OFF switch and an indicator lamp. For 110V or 240V a.c. single phase supplies. Each **£48·00** *fN*

REPLACEMENT PARTS

PE-787 **Heater** ... ... Each **£2·50** *fN*
PE-784 **Asbestos boards.** See entry in List No. sequence.

When ordering please state voltage and frequency of supply.

PE-790

CONDENSER, straight type, IP 123, BS 658 Type 3, with polished nickel plated, single walled, condenser tank on stove enamelled stand ... ... Each **£16·00** *fN*

PE-791

CONDENSER, single spiral type, with polished nickel plated condenser tank with stove enamelled aluminium box stand ... ... Each **£22·50** *fN*

PE-792

CONDENSER, Liebig, BS 658 Type 1 and STPTC C1, borosilicate glass, with bent end and rubber connections, overall length about 600 mm ... ... Each **£1·70** *a*

PE-795

CONDENSER, air, BS 658 Type 2 and STPTC C3, borosilicate glass, length 600 mm ... Each **£0·55** *a*

PE-797

FLASK, distillation, *Pyrex brand* glass, 125 ml to ASTM D86-IP 123 and ASTM E 133.
36 **£21·40** 12 **£7·60** *d*
Each **£0·70**

PE-798

FLASK, distillation, 200 ml to IP 195, and ASTM E 133, borosilicate glass ... Ten **£6·60** Each **£0·74** *m*

PE-790

DISTILLATION RECEIVERS—see CYLINDERS.
DISTILLATION THERMOMETERS—see THERMOMETERS.

Items on this page normally available from stock except those coded *N*.

DROP POINT OF GREASE, IP 31, BS 894 (Ubbelohde apparatus)

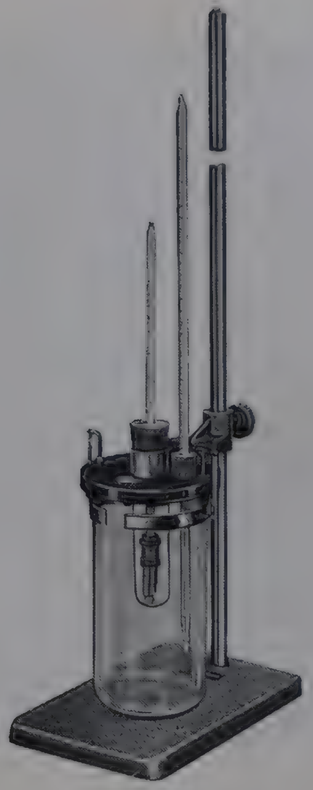
PE-805

DROP POINT OF GREASE APPARATUS, *Seta*, comprising one each IP 40C and IP 41C thermometers fitted with sleeve and case, two metal cups, 600 ml glass beaker, with cover and test tube with cork.

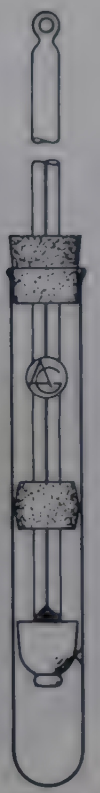
Each **£25·00** *fN*

REPLACEMENT PARTS

PE-810	**Metal cup**...	Pack of 5	**£3·50**	*f*
PE-812	**Thermometer assembly,** comprising IP 40C thermometer fitted with sleeve	Each	**£5·50**	*f*
PE-814	**Thermometer assembly,** comprising IP 41C thermometer fitted with sleeve	Each	**£5·50**	*f*
PE-822	**Test tube, borosilicate glass,** 110 × 25 mm. Ten **£2·70**	Each	**£0·33**	*a*



PE-805 with stand



PE-830
PE-834
TK-613

DROPPING POINT OF LUBRICATING GREASE, ASTM D566 - IP 132

PE-830

TEST TUBE, borosilicate glass, diameter 12 mm, length 100 mm, with three indentations 19 mm from bottom, fitted with corks bored to take thermometer. **Without thermometer.**

Ten **£3·40** Each **£0·40** *a*

PE-834

CUP, plated brass. Ten **£5·20** Each **£0·58** *m*

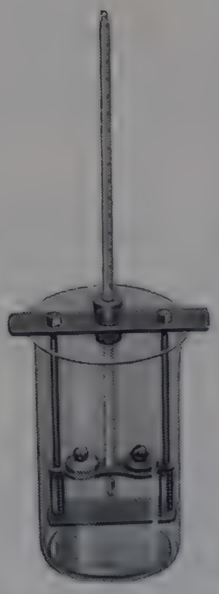
ACCESSORIES

BJ-625	**Beaker,** borosilicate glass, tall form 400 ml	For full details and prices see entries in List No. sequence.
TK-612	**Thermometer,** IP 62F	
TK-613	**Thermometer,** IP 62C	

SOFTENING POINT OF BITUMEN RING AND BALL METHOD IP 58

PE-850

RING AND BALL APPARATUS, 2-test, comprising plated brass frame, two standard tapered rings, two ball centering guides and two steel balls. **Without beaker or thermometer** ... ... Each **£7·50** *f*



PE-850 with BJ-655 and TK-609

SOFTENING POINT OF ASPHALT (BITUMEN) AND TAR IN ETHYLENE GLYCOL, RING AND BALL ASTM D2398 - IP 198

PE-855

RING AND BALL APPARATUS, 2-test, comprising plated brass frame, two standard shouldered rings, two ball centering guides and two steel balls. **Without beaker or thermometer** ... ... Each **£7·50** *f*

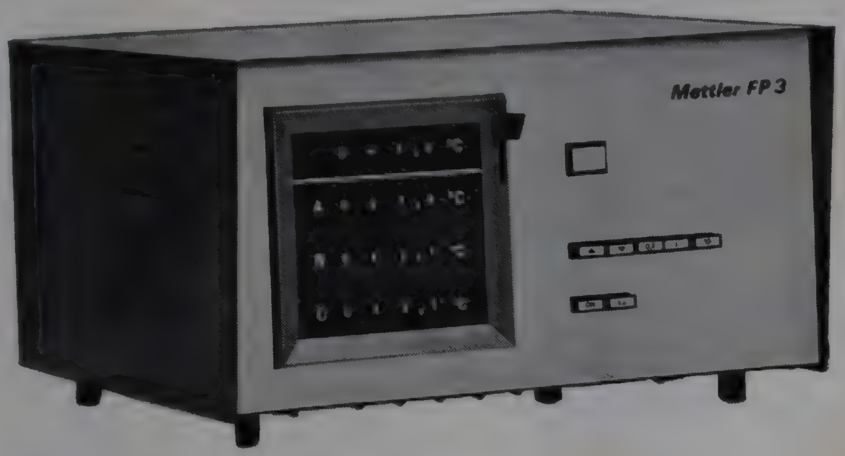
ACCESSORIES AND REPLACEMENT PARTS FOR PE-850 and PE-855

BJ-655	**Beaker,** squat form, 600 ml. For price see entry in List No. sequence.			
PE-862	**Standard ring, tapered,** for PE-850.	Pack of 10	**£7·50**	*f*
PE-864	**Ball centering guide,** for tapered ring, for PE-850.	Pack of 10	**£10·00**	*f*
PE-866	**Standard ring, shouldered,** for PE-855.	Pack of 10	**£7·50**	*f*
PE-868	**Ball centering guide,** for shouldered ring, for PE-855.	Pack of 10	**£10·00**	*f*
PE-872	**Steel balls,** ⅜ in dia.	Pack of 10	**£0·40**	*f*
SS-425	**Stirrer**	For prices see entries in List No. sequence.		
SS-455	**Chuck to hold stirring rotor**... ...			
SS-546	**Stirring rotor**...			
TK-609	**Thermometer,** IP 60C			
TK-611	**Thermometer,** IP 61C			
TK-666	**Thermometer,** IP 89F			
TK-668	**Thermometer,** IP 89C			

Items on this page normally available from stock except those coded *N*.

METTLER AUTOMATIC DROP POINT APPARATUS MODEL FP3

For the rapid determination of the drop point of greases in accordance with methods described in ASTM D566 - IP 132 and DIN 51801 using grease cup of standard dimensions



part MF-480

- **Photoelectric detection ensures reproducible results**
- **Digital indication of drop point temperature**
- **Heating programme and starting temperature preselected by push button**
- **Fully automatic control of temperature**
- **Fully transistorised circuitry**

For details and price see MF-480 in List No. sequence.

ELECTRIC STRENGTH—TRANSFORMER OIL, BS 148, IP 20 and ASTM D877

PORTABLE OIL TEST SET 50,000 V

A portable and compact mains operated instrument for measuring electric strength of switch and transformer oils under test room conditions.

TEST CELL

The apparatus is normally supplied with a test cell in which the electrodes are mounted in the lid so that oil samples may rapidly be changed, thus avoiding the necessity for a number of spare vessels each complete with electrodes. Alternative test cells complying with BS 148, IP 20 and ASTM D877 are also available.

PE-925

POWER UNIT

The set provides smooth, infinitely variable control of output voltage between zero and 50 kV r.m.s. with no inherent distortion of waveform. A clearly marked earth terminal is provided, and the user is protected by a safety switch which de-energises the set immediately the Perspex hood is raised. The high tension transformer is protected by solid insulation.

DIMENSIONS

H	W	D	Weight
45 ×	38 ×	35 cm	30 kg

PE-925

OIL TEST SET, portable, 50,000V, as specification. With electrode spacing gauge, spare variable transformer contact and spare 3A fuse. For 110/120 or 200/250V 50/60 Hz supplies only ... ... Each **£230·00** *m*

When ordering please state voltage and frequency of supply.

ACCESSORIES

PE-930	**Extra test vessel, glass, for test cell supplied.**	Each **£1·40** *mS*
PE-932	**Test cell to BS 148 and IP 20, with electrodes and gauge.**	Each **£14·20** *m*
PE-934	**Test cell to ASTM D 877, with electrodes and gauge.**	Each **£14·20** *m*

Items on this page coded S normally available from stock.

FLASH POINT BY THE ABEL APPARATUS—

Petroleum (Consolidation) Act 1928, IP 33 and IP 170

For determining the closed-cup flash point of petroleum products between 0° and 120°F.

PF-030

FLASH POINT APPARATUS, Abel, in accordance with Petroleum (Consolidation) Act 1928. With coal gas test jet, coal gas burner for heating, stirrer, one each thermometers PF-050 and PF-052, pendulum and suspension hook in hardwood case. Verified by the Board of Trade.
Each **£97·50** *f*

PF-032

FLASH POINT APPARATUS, Abel, as PF-030 but with methane gas burner ... ... Each **£99·50** *f*

PF-034

FLASH POINT APPARATUS, Abel, as PF-030 but with test jet for coal gas or methane and electric heating element. Verified by the Board of Trade. For a.c. single phase or d.c. supplies.

For 220/240V ... ... Each **£102·50** *f*

When ordering please state voltage and frequency of supply.

PF-036

FLASH POINT APPARATUS, Abel, as PF-030 but with oil test jet and heating by spirit lamp. Verified by the Board of Trade ... ... Each **£97·50** *f*

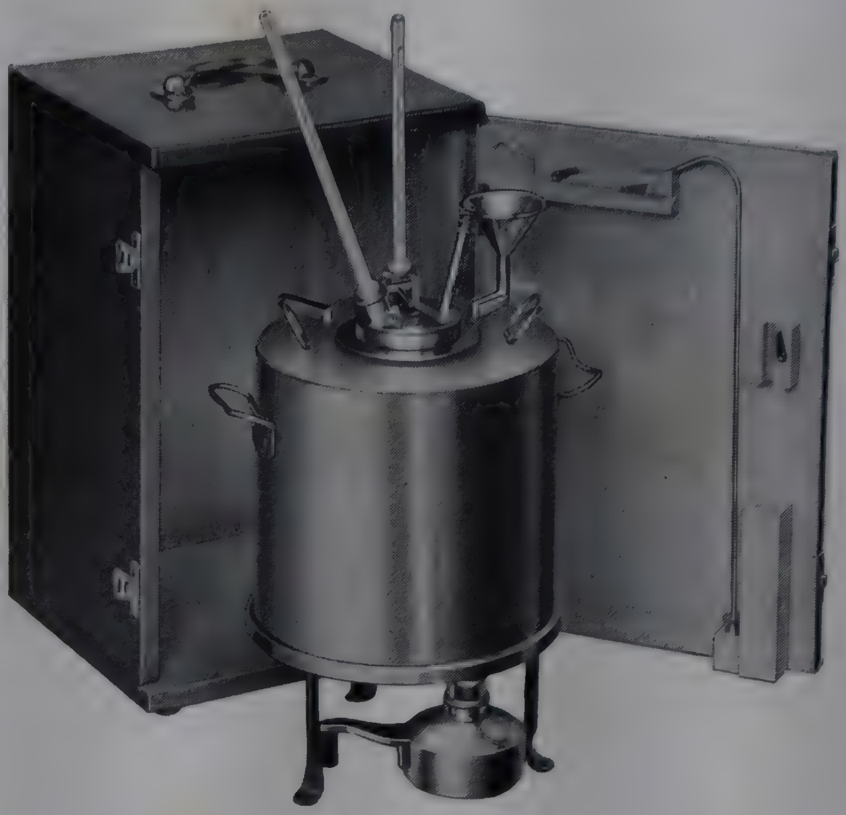
REPLACEMENT PARTS

PF-050 **Thermometer,** Abel oil-cup, with collar, scale span 50 to 150°F, subdivided in 1degF, verified by the Board of Trade. (B.O.T. serial number stamped on instrument must be quoted unless thermometer is ordered with new instrument) ... ... Each **£6·50** *f*

PF-052 **Thermometer,** Abel water bath, with collar, scale span 90 to 190°F, subdivided in 1degF, verified by the Board of Trade. (B.O.T. serial number stamped on instrument must be quoted unless thermometer is ordered with new instrument) ... ... Each **£6·50** *f*

ACCESSORIES

TK-540	**Thermometer,** Abel oil-cup, °F ...	For full details and prices see entries in List No. sequence.
TK-541	**Thermometer,** Abel oil-cup, °C ...	
TK-636	**Thermometer,** Abel oil-cup, wide range	
TK-542	**Thermometer,** Abel water bath, °F...	
TK-543	**Thermometer,** Abel water bath, °C...	
TK-638	**Thermometer,** Abel water bath, wide range	


PF-036

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

AUTOFLASH

AUTOMATIC FLASH POINT APPARATUS

For Pensky-Martens flash-point tests up to 700°F and 370°C in accordance with ASTM D 93—IP 34 and NF M 07-019.

(Developed jointly by Gallenkamp and Stanhope-Seta).

PROGRAMMER

- **Digital temperature indicator**
- **Optional °F and °C readout**
- **Precise heating rate**
- **Accurately timed test flame cycle**
- **Controlled steady stirring**
- **Positive flash detection**
- **Rapid heating facility**
- **Built-in alarm**
- **Safety cut-outs**

The apparatus is automatic and represents a significant step forward in the field of petroleum products testing, providing greater accuracy, increased reproducibility and a large saving in labour costs, operators being free to conduct other work once the test has been initiated.

TESTER

CONSTRUCTION

The **Tester** comprises a standard Pensky-Martens flash cup resting in an electrically heated block which has a self-emptying water cooling coil controlled by a solenoid valve.

The sample stirrer is driven by a constant speed motor and another similar motor actuates the shutter mechanism. At a signal from the programmer, the stirrer stops dead, one flame dipping cycle is actuated and the stirrer then restarts. The timing of the dipping cycle is very accurate—a feature which is of supreme importance in determining true flash points.

Sample temperature is measured by a platinum resistance thermometer. A differential thermocouple† in the vapour space signals the occurrence of a flash.
(† Designed in co-operation with the late Mr. F. S. Alvey, B.P. Research Centre).

The functions of the **Programmer** include precise control of the heating rate, indicating the sample temperature, initiating the dipping cycles at correct intervals, detecting the flash and finally controlling the application of cooling water.

The platinum resistance thermometer, working in conjunction with a resistance bridge, amplifier, helical potentiometer and null seeking motor, drives a counter to give digital readout of temperature. Check points are provided for testing the temperature indicator at 100°F and 600°F.

The power input to the heater is supplied from a variable autotransformer which is programmed to give a rough approximation to the specified heating rate. The output from the transformer is then continuously adjusted by a system which compares the actual heating rate as measured by the helical potentiometer with that of a constant speed timing motor.

The apparatus is fitted with an internal 'end of test' audible alarm and provision is made for disconnecting this and using the relay to sound a remote alarm if required.

AUTOFLASH

(continued)

OPERATION

The sample is poured into the cup which is then inserted into the heating bath. After fitting the cup cover, attaching the stirrer and shutter mechanism drives and adjusting the test flame, the operator selects the temperature at which the test flame is first to be applied, switches to NORMAL or RAPID heating and turns the control knob to 'RUN'. Thereafter the whole test proceeds automatically. Since temperature programme control, dipping cycle and flash detection are strictly in accordance with the standard specifications human error is eliminated and results are accurate and repeatable.

Flexible leads of any reasonable length may be used to connect the Pensky-Martens tester to the programmer thus permitting tests to be carried out in a fume cupboard without exposing the programmer to contaminating atmospheres.

Operational cycle (°F)

With the switch set to NORMAL heating, auto temperature control heats the sample at the specified rate of 10degF per minute in accordance with test specification ASTM D93–IP 34. With the switch set to the RAPID heat position the sample is initially heated at a high rate but the instrument automatically cuts back to the standard rate of heating before the flame dipping cycle commences. At the temperature pre-selected by the operator the stirrer stops, the test flame is applied and, if no flash occurs, the test continues. This cycle is repeated every 2degF below 220°F and every 5degF above 220°F until the flash point is reached. When the flash occurs, a Flash Point lamp lights on the front panel and an alarm sounds inside the instrument, the heater switches off and cooling water circulates to prepare the apparatus for the next test. As a safety precaution the shutter closes. The accurate flash point is left displayed on the digital counter to be read off by the operator.

If the flash has not occurred before the temperature of the sample reaches 100degF above the anticipated flash point or 700°F (whichever is the lower), the test is automatically terminated by means of the Safety Limit Switch, the NO FLASH indicator lamp lights up and the alarm sounds but the FLASH POINT indicator lamp does not light up. (This facility is useful for 'go/no go' testing).

Operational cycle (°C)

The cycle of operation of AUTOFLASH when indicating in degrees Centigrade is similar to that described above. The flame is inserted into the cup every 1degC for flash points up to 105°C. Above 105°C the flame is inserted every 3degC for ASTM D93–IP 34 or every 2degC for NF M 07–019.

Mains services

Electricity	220/240V 50 Hz or 110/120V 60 Hz Maximum power rating 550 W
Gas	Coal gas, natural gas and propane
Water	Cooling water temperature below 70°F (21°C)

Dimensions and weights	*Tester*	*Programmer*
Overall dimensions	31 × 43 × 43 cm	33 × 32 × 42 cm
Weight, net	16 kg	24 kg

PF-070

AUTOFLASH, Automatic Pensky-Martens Flash Point Apparatus with **readout in °F.** Comprises tester and programmer with 180 cm interconnecting cable (longer cables can be supplied to order). **Includes parts for conversion to NF M 07–019 and to °C readout,** special tools, lubricant and full instructions for installing, operating and maintaining. For 220/240V 50 Hz single phase supplies ... ... Each **£825·00** *g*

PF-072

AUTOFLASH, as PF-070, but for 110/120V 60 Hz single phase supplies ... ... Each **£825·00** *gN*

NOTE: Both PF-070 and PF-072 can be supplied ready for operation to NF M 07–019 and with °C readout at no extra charge, if clearly specified on order.

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

PF-076 **Stand-by spares kit,** comprising one each flash detecting thermocouple, autotransformer brush, indicator lamp, amplifier valve, thyratron valve, general purpose microswitch, miniature microswitch; two power relays; six each fuses and 30 cm gas tubing ... ... Kit **£15·50** *g*

PF-077 **Spares kit for 12 months' operation,** comprising two kits PF-076 and one each resistance thermometer, probe, plug and socket, multiturn potentiometer, synchronous chopper and counter flexible drive for Programmer, and stirrer flexible drive, motor, heater and relay for Tester. Kit **£116·00** *g*

When ordering Spares Kits, please state whether for PE-070 or PF-072.

PF-080 **Instruction manual,** additional copy ... Each **£1·05** *b*

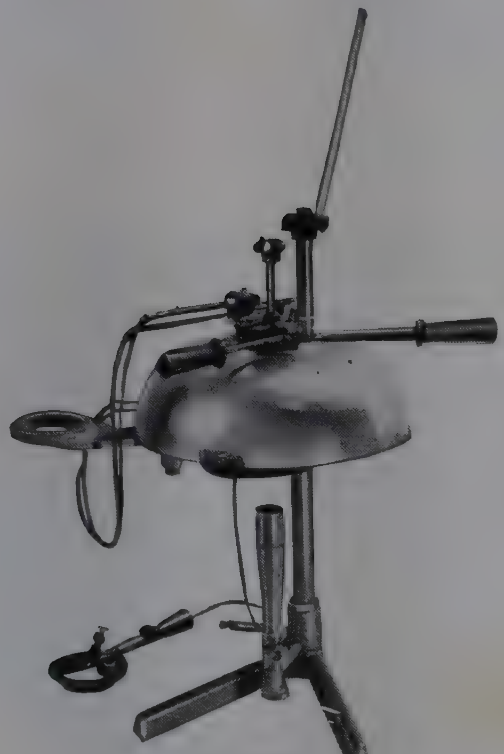
RECOMMENDED ACCESSORY

PF-090 **Flash simulator, for testing and setting the flash detector amplifier of Autoflash.** A self-contained, battery powered instrument which supplies to the amplifier a pulse of similar characteristics to that from the differential thermocouple when a vapour flash occurs. Produces peak potentials of 0·15 mV and 0·25 mV. Includes built-in battery check. In robust diecast case. Dimensions 5·5 × 6·0 × 11·0 cm... ... Each **£13·00** *b*

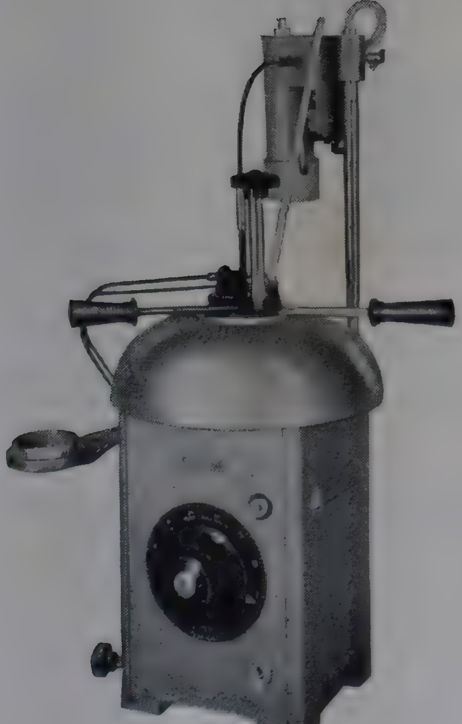
Items on this page normally available from stock except those coded *N*.

FLASH POINT BY THE PENSKY-MARTENS CLOSED TESTER, ASTM D93 - IP 34

For determining the flash point of petroleum products having flash points above 120°F.



PF-100



PF-110 with PF-124

PF-100

FLASH POINT APPARATUS, Pensky-Martens, *Seta*, gas heated, with gas test jet. Comprises cast iron air bath with stainless steel top plate, mounted on an upright, which is also a gas manifold feeding a needle valve controlled Meker burner, and the adjustable test and pilot flames. An additional control valve supplies gas for an open flash clip PF-130. There is a ring support for the lid when not in use. The cup lid is clamped in position but easily removable. Supplied complete with gas burner and thermometer collar but **without thermometer.**

Each **£45·00** *f*

PF-104

FLASH POINT APPARATUS, Pensky-Martens, *Seta*, as PF-100 but with LPG test jet and heating burner.

Each **£50·00** *f*

PF-110

FLASH POINT APPARATUS, Pensky-Martens, *Seta*, electrically heated, with gas test jet. Comprises cast iron air bath fitted with side and base heaters. A variable transformer mounted in the bottom compartment ensures smooth and easy control of the temperature rise. Provision is made for accelerated cooling by means of an air connection to the interior of the cylindrical stainless steel baffle surrounding the heater units. Total loading 550W. Supplied with one thermometer collar but **without thermometer.**

For 200/250V a.c. supplies ... ... Each **£70·00** *fS*
For 110/130V a.c. supplies ... ... Each **£70·00** *f*

When ordering please state voltage and frequency of supply.

PF-114

FLASH POINT APPARATUS, Pensky-Martens, *Seta*, as PF-110 but with oil test jet.

For 200/250V a.c. supplies ... ... Each **£70·00** *f*
For 110/130V a.c. supplies ... ... Each **£70·00** *f*

When ordering please state voltage and frequency of supply.

PF-124

GEARED MOTOR UNIT, complete with flexible drive for attaching to Pensky-Martens flash point apparatus PF-100 et seq. Recommended for routine work where it obviates tedious hand operation.

For 200/250V a.c. supplies ... ... Each **£28·00** *f*
For 110/130V a.c. supplies ... ... Each **£28·00** *f*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

PF-126 **Thermometer collar** ... ... Each **£0·40** *fS*
PF-128 **Heating elements** for PF-110 and PF-114. Pair **£10·00** *f*

ACCESSORIES

TK-522	**Thermometer,** IP 15F Pensky-Martens low	For details and prices see entries in List No. sequence.
TK-523	**Thermometer,** IP 15C Pensky-Martens low	
TK-524	**Thermometer,** IP 16F Pensky-Martens high	
TK-525	**Thermometer,** IP 16C Pensky-Martens high	

FLASH POINT (OPEN) AND FIRE POINT BY THE PENSKY-MARTENS APPARATUS, IP 35

PF-130

CLIP, with gas test jet, for use with flash point apparatus PF-100, PF-104, PF-110 and PF-114 ... Each **£14·00** *f*

Items on this page coded *S* normally available from stock.

FLASH AND FIRE POINTS BY THE CLEVELAND OPEN CUP, ASTM D92-IP 36

For determining the flash and fire points of all petroleum products except fuel oils and those having an open cup flash below 175°F.

PF-150

FLASH POINT APPARATUS, Cleveland, *Seta*, gas heated with adjustable gas test jet, brass cup with plastics handle. The assembly with a draught screen for burner is mounted on a combined upright and gas manifold which feeds a Meker burner and the test jet. **Without thermometer** ... ... Each **£35·00** *f*

PF-156

FLASH POINT APPARATUS, Cleveland, *Seta*, electric heating and gas test jet. The cup, asbestos board and test flame assembly are mounted on an electric heater controlled by a variable transformer. For 200/250V a.c. single phase supplies. **Without thermometer.** Each **£60·00** *f*

ACCESSORIES

TK-544	**Thermometer,** IP 28F Cleveland...	For details and prices see entries in List No. sequence.
TK-545	**Thermometer,** IP 28C Cleveland...	

PORTABLE FLASH TESTER

PF-170

FLASH POINT APPARATUS, portable, closed cup, *SetaFlash*, for the rapid determination of flash points or for use as a quick go/no go tester for checking products at specific test temperatures. Requires only 2 ml of sample to determine flash point to within 1degC. With thermometer for **temperature range 10°C to 110°C.** Designed for field use and complete with built-in LPG tank for test flame having a fuel capacity for over 1000 tests. Alternatively mains gas may be used for the test flame by using accessory adapter PF-177. Dimensions 40×12×14 cm; weight 4 kg; power consumption 50W. **Requires but not supplied with either power pack PF-173 for 100/250V 50/60 Hz supplies or battery lead PF-174 for 12V d.c. supplies.** Without carrying case. Each **£105·00** *f*

ACCESSORIES

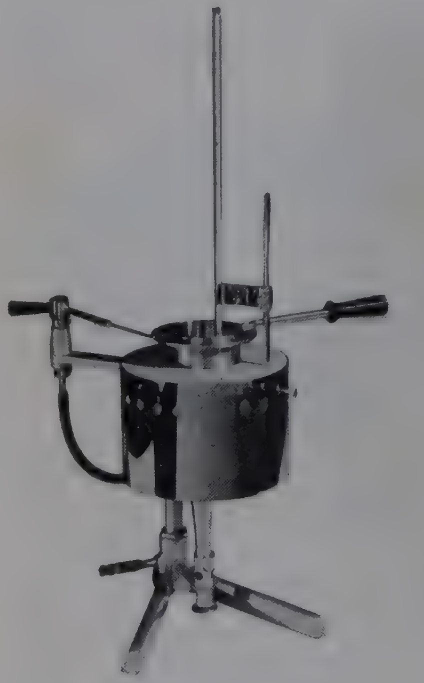
PF-173	**Power pack,** for 100/250V 50/60 Hz supplies.	Each	£15·00	*f*
PF-174	**Battery lead,** with clips...	Each	£2·25	*f*
PF-175	**Carrying case,** with shoulder strap ...	Each	£6·50	*f*
PF-176	**LPG refills cylinder,** large size, for fuel tank.	Pack of 6	£2·40	*fS*
PF-177	**Adapter,** for mains gas supply	Each	£2·50	*f*
PF-178	**Thermometer,** Fahrenheit, range 50° to 230°F.	Each	£1·50	*f*

PF-185

FLASH POINT APPARATUS, portable, closed cup, *SetaFlash*, as PF-170 but with thermometer for **temperature range 100 to 280°C.** Dimensions 41×14×14 cm; weight 5 kg. **Requires but not supplied with either power pack PF-188 or battery lead PF-174.** Without carrying case ... ... Each **£155·00** *f*

ACCESSORIES

PF-188	**Power pack** for 100/250V 50/60 Hz supplies.	Each	£20·00	*f*
PF-189	**Carrying case** with shoulder strap ...	Each	£7·50	*f*
PF-190	**Thermometer,** Fahrenheit range 212° to 536°F.	Each	£2·00	*f*
PF-174	**Battery lead** with clips	For prices see entries above.		
PF-176	**LPG refills**			
PF-177	**Adapter** for mains gas supply ...			



PF-150

PF-156

SetaFlash
S

PF-170

FOAMING CHARACTERISTICS OF LUBRICATING OILS, ASTM D892-IP 146

PF-200

GAS DIFFUSER STONE, fitted with tube. Each **£4·50** *fS*

PF-202

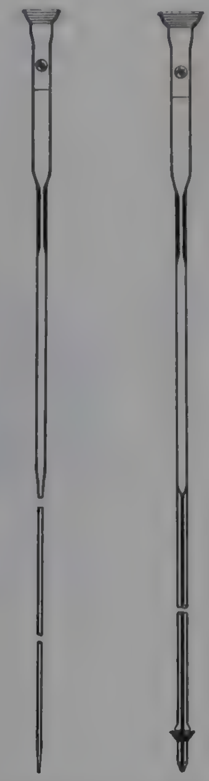
GRADUATED CYLINDER, *Pyrex* brand glass, 1000 ml ... ... Each **£1·75** *mS*

ACCESSORIES

AB-525	**Absorption tower,** 30×5 cm ...	For details and prices see entries in List No. sequence.
FL-550	**Flowmeter**	
FL-556	**Flowmeter jet,** No. 4	
GF-052	**Gas meter**	
TB-600	**Tank,** *Pyrex brand* glass, 30×45 cm	
TM-860	**Temperature controller**... ...	
TK-616	**Thermometer,** IP 64F	
TK-617	**Thermometer,** IP 64C	

Items on this page coded *S* **normally available from stock.**

PF-260



PF-310 PF-312

LUBRICANT TESTING—ROLL STABILITY ASTM D1831

PF-260

ROLL STABILITY TESTER, *Seta*, for 1 to 4 cylinder assemblies each containing a weighted roller. The cylinders are housed in a hot air oven with hinged lid and rotated at either 10 or 165 rev/min. **Requires but does not include** roller weights PF-262 and cylinder PF-264. For 110/130 or 200/250V 50 or 60 Hz single phase supplies.
Each £325·00 *f*

When ordering please state voltage and frequency of supply also number of roller weights PF-262 and cylinders PF-264 required.

ACCESSORIES

PF-262	Roller weight	Each £8·00	*f*
PF-264	Cylinder	Each £25·00	*f*
PF-725	Cone, quarter scale	For prices see entries in List No. sequence.	
PF-770	Greaseworker, quarter scale ...		

HYDROCARBON TYPES IN LIQUID PETROLEUM PRODUCTS ASTM D1319-IP 156

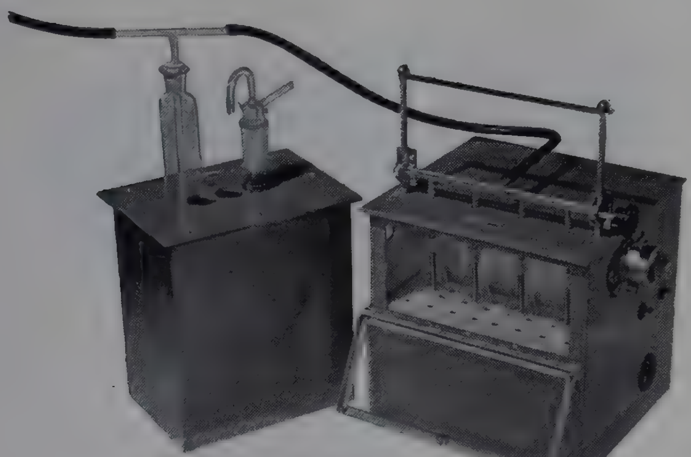
PF-310

COLUMN, Ⓐ, adsorption, standard wall glass tubing, with spherical cup S29 (28/12) and vinyl tubing connecting separator and analyser sections. Overall length approx. 170 cm ... ... Each **£6·30** *aS*

PF-312

COLUMN, Ⓐ, adsorption, precision bore glass tubing, with spherical cup S29 (28/12) and spherical joint S13 (12/2) in analyser section. Overall length approx. 170 cm.
Each **£8·85** *aS*

For suitable joint clips see JR-260, S29 and S13 in List No. sequence.



PF-340 with PF-342

OIL CONTENT OF PETROLEUM WAXES ASTM D721-IP 158

PF-340

OIL CONTENT APPARATUS, *Seta*, comprising bath for three filter stick assemblies, thermostatically controlled evaporation cabinet for four 15 ml weighing bottles and air manifold. Provision is made for mounting the air regulator behind the bath For 200/250V a.c. supplies.
Without glassware ... ... Each **£180·00** *f*

ACCESSORY

PF-342	Glassware, for PF-340 comprising air regulator, filter stick, cooling coil and four 15 ml weighing bottles.	Set £9·50	*f*

PF-355

OIL SEPARATION FROM LUBRICATING GREASE DURING STORAGE ASTM D1742

PF-355

SEPARATION APPARATUS, comprising six grease test cells type B, air pressure rack with manifold, control valves, air regulator and pressure gauge.
Each **£280·00** *f*

FREEZING POINT OF AVIATION FUELS ASTM D2386-IP 16

PF-360

FREEZING POINT APPARATUS, *Seta*, comprising unsilvered vacuum flask in protective case and a clear jacketed sample tube with cork stopper, brass packing gland and stirrer. **Without thermometer.**
Each **£30·00** *f*

REPLACEMENT PARTS

PF-362	Jacketed sample tube	Each £3·50	*f*
PF-364	Vacuum flask, unsilvered	Each £4·00	*f*
PF-366	Packing gland, brass	Each £4·00	*f*

ACCESSORY

TK-521	Thermometer, IP 14C. For details and price see entry in List No. sequence.

Items on this page coded S normally available from stock.

OXIDATION STABILITY OF AVIATION FUELS ASTM D873-IP 183

OXIDATION STABILITY OF GASOLINE ASTM D525-IP 40

PF-400

OXIDATION STABILITY BOMB, 18/8 chromium nickel alloy steel, plated gunmetal, sealing ring, and neoprene gasket. The feed tube has a metal support disk and is fitted with a needle valve ... Each **£65·00** *f*

REPLACEMENT PART

PF-402	**Gasket,** neoprene	Ten	**£1·50**	*fS*

ACCESSORIES

PF-404	**Flexible tube,** 1·5 metres long, with couplings for connecting bomb to recorder	Each	**£4·50**	*f*
PF-406	**Wrench,** for tightening closure ring ...	Each	**£5·50**	*f*
PF-408	**Bench socket,** for body of bomb ...	Each	**£4·50**	*f*
PF-410	**Glass liner,** with cover, borosilicate glass. Ten **£11·00**	Each	**£1·20**	*f*

PF-414

OXYGEN CHARGING OUTFIT, comprising pressure regulator with two gauges for attaching to oxygen cylinder and 1·8 metres flexible pressure hose with air duct for fitting to bombs ... Each **£25·00** *f*

PF-420

PRESSURE RECORDER, two pen, with 25 cm dia. chart, range 80 to 200 lbf/in² in 2 lb divisions, complete with 100 charts and two coloured inks. For 110/120, 200/220 or 230/250V 50 Hz single phase supplies. Each **£37·00** *f*

When ordering please state voltage and frequency of supply.

PF-430

WATER BATH, for two bombs, constructed of heavy gauge tinned brass. Inside dimensions 35 × 30 × 41 cm deep, with stainless steel top, lagged and provided with 2·5 cm overhang for flush mounting in bench top. Fitted with 3-heat switch, maximum load 2 kW. Complete with condensers with lids but without bombs. For 110/120 or 230/250V a.c. single phase supplies ... Each **£130·00** *f*

When ordering please state voltage and frequency of supply.

PF-430

OXIDATION TEST FOR TRANSFORMER OIL, BS 148 and IP 56

OXIDATION TEST FOR TURBINE OIL, IP 114

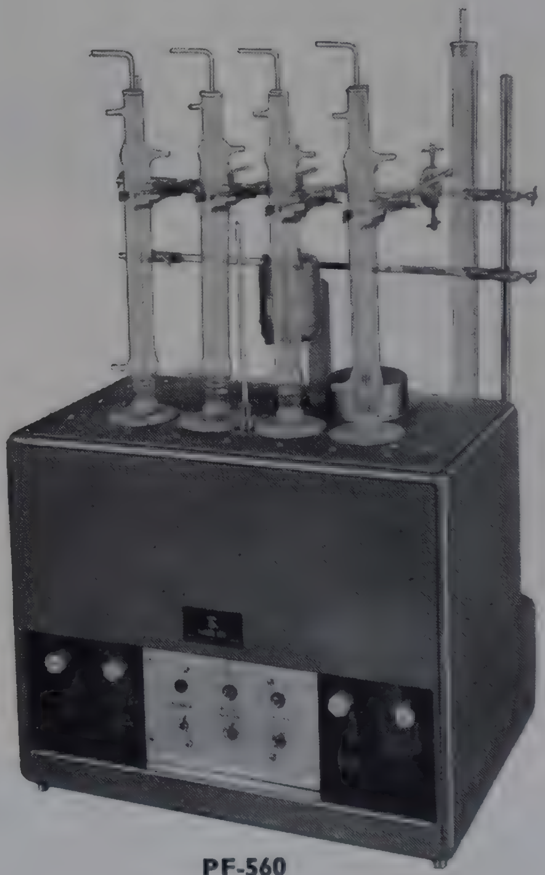
PF-560

OXIDATION TEST OIL BATH, 4-test, *Seta.* Accommodates four oxidation flasks. The air supply is through a manifold and four flowmeters mounted on the front panel. Needle valves control the excess air bled off at the rear mounted pressure regulators, air flow being regulated by a glass capillary tube in the line from the flowmeters to the inlet tubes. Loading 2 kW. For 100/130. 200/220 and 230/250 50 Hz single phase supplies. **Without thermometer or glassware.** Each **£280·00** *f*

When ordering please state voltage and frequency of supply.

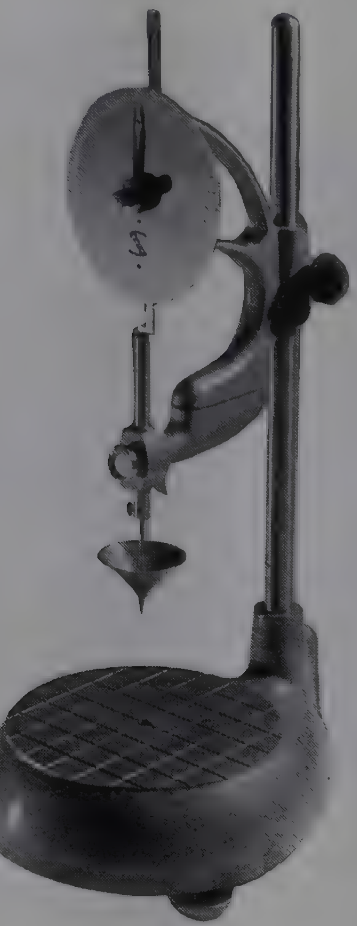
ACCESSORIES

PF-575	**Glassware,** for PF-560, comprising pressure regulator, air bleed tube and four each flasks, condensers and air inlet tubes	Set	**£25·00**	*f*
PF-577	**Pressure compensator,** glass, complete with inlet tube and stopper	Each	**£4·00**	*f*
PF-580	**Purifying and drying train,** comprising two 1 litre Woulff bottles, one 2 litre Woulff bottle, drying tower, connecting tubes, safety bulbs and rubber stoppers.	Each	**£16·50**	*cS*
GR-100	**Glass balls,** 3 mm ...	For details and prices see entries in List No. sequence		
TK-563	**Thermometer,** IP 37C			



PF-560
with glassware

Items on this page coded *S* **normally available from stock.**



PF-650

PENETRATION OF BITUMEN, IP 49 and ASTM D5.

CONE PENETRATION OF LUBRICATING GREASE, ASTM D217-IP 50.

CONE PENETRATION OF PETROLATUM, ASTM D937-IP 179.

PENETRATION OF SEMI-FLUID GREASES, IP 167.

PENETROMETERS

PF-650

PENETROMETER, *Seta*, **standard manual model,** with **rack and pinion adjustment** of needle or cone tip. On heavy base with adjusting feet and inset spirit level. The head may be swung to one side for testing samples in a water bath. Readout is on a 15 cm dia. dial graduated 0 to 400 in intervals of 0·1 mm. With 47·5 g plunger and one each 50 g and 100 g weights. **Without needles or** cones ... ... Each **£34·00** *f*

PF-652

PENETROMETER, *Seta*, **standard automatic model,** as PF-650 but with solid state timer for 5, 8, 10 and 12 seconds free fall, after which the electromagnetic head is locked. **Without needles or cones.** For 100/130 and 200/250V 50/60 Hz single phase supplies. Each **£104·00** *f*

PF-660

PENETROMETER, *Seta*, **universal manual model,** as PF-650 but with **geared drive** having coarse and fine controls and with read out on an 11 cm dia. dial. **Without needles or cones** ... ... Each **£50·00** *f*

PF-662

PENETROMETER, *Seta*, **universal automatic model,** as PF-660 but with solid state timer for 5, 8, 10 and 12 seconds free fall, after which the electromagnetic head is locked. **Without needles or cones.** For 100/130 and 200/250V 50/60 Hz single phase supplies. Each **£120·00** *f*

PF-662

GENERAL ACCESSORIES

PF-682	**Adjustable mirror,** with clamp ...		Each **£5·00**	*f*
PF-684	**Sample container,** aluminium, 55 mm dia. × 35 mm deep	Ten **£1·60**	Each **£0·23**	*cS*
PF-685	**Sample container,** aluminium, 55 mm dia. × 57 mm deep for material with a penetration over 225.	Ten **£1·95**	Each **£0·26**	*cS*
PF-686	**Sample container,** copper, extra rigid with dished bottom, 55 mm dia. × 35 mm deep.	Ten **£2·20**	Each **£0·28**	*cS*
PF-687	**Sample container,** as PF-686 but, 55 mm dia. × 57 mm deep for materials with a penetration over 225.	Ten **£2·90**	Each **£0·35**	*cS*
PF-688	**Transfer dish,** made of heavy gauge chromium-plated copper with reinforced platform giving very rigid support for sample container, 100 mm dia. × 75 mm deep.		Each **£2·50**	*fS*
TK-565	**Thermometer,** IP 38C. For details and price see entry in List No. sequence.			

Items on this page coded S normally available from stock.

PENETROMETER ACCESSORIES

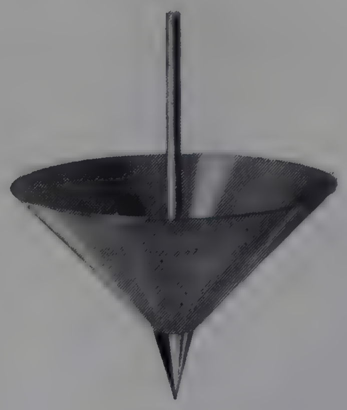
PENETRATION CONES AND NEEDLES

PF-690
PENETRATION NEEDLE, to IP 49. Each **£1·00** *fS*

PF-694
PENETRATION NEEDLE, to ASTM D5. Each **£1·50** *fS*

PF-698
PENETRATION NEEDLE FOR WAXES, to ASTM D1321 ... ... Each **£10·00** *f*

PF-705
PENETRATION CONE, to ASTM D217-IP 50, for penetration of grease to a limiting value of 400 and petrolatum to ASTM D937-IP 179 ... ... Each **£12·00** *f*


PF-705
PF-715

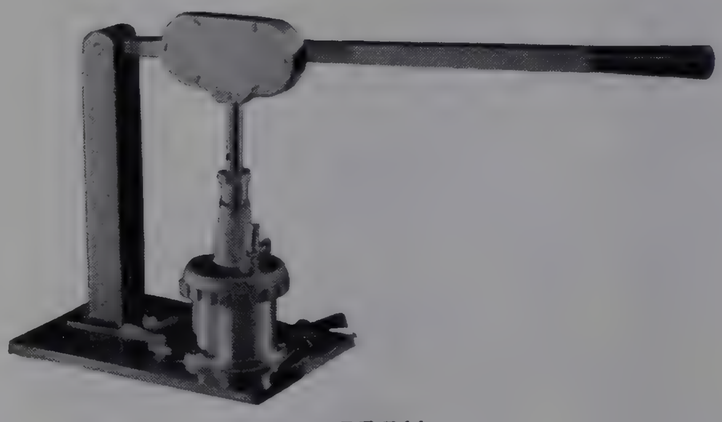
PF-715
PENETRATION CONE, to IP 167, for penetration of semi-fluid greases having penetrations greater than 350 ... ... Each **£16·00** *f*

PF-725
PENETRATION CONE, quarter scale, to ASTM D1403, for penetration of lubricating grease. Each **£14·00** *f*

ACCESSORY
PF-727 **Plunger** for use with PF-725 ... ... Each **£6·00** *f*

GREASEWORKERS

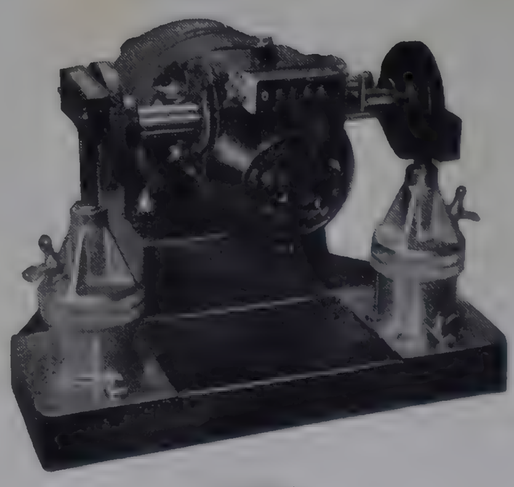
PF-740
GREASEWORKER, *Seta,* to ASTM D217-IP 50, with central operating rod, pot and watertight cover fitted with air release cock ... ... Each **£28·00** *f*


PF-744

PF-744
GREASEWORKER, *Seta,* as PF-740 but with slave which greatly facilitates the working of heavy greases at up to 60 double strokes per minute ... Each **£45·00** *f*

PF-760
GREASEWORKER, MECHANICAL, electrically driven, with two greaseworkers to ASTM D217-IP 50. The machine is driven by a motor through a reduction gear to give a speed of 60 strokes per minute. The motor has overload protection and a no-volt trip starter. A five figure counter indicates the number of strokes. Two water-tight covers are provided so that the samples can be immersed in a water bath. For 100/110, 200/220 or 230/250V 50 Hz single phase supplies ... Each **£257·00** *f*

When ordering please state voltage and frequency of supply.


PF-760

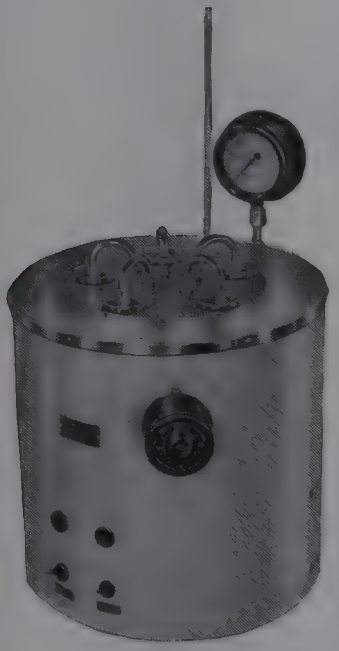
PF-770
GREASEWORKER, *Seta,* quarter scale, to ASTM D1403, for use with 5 g of sample. Complete with bench clamp. Each **£20·50** *f*

Items on this page coded *S* normally available from stock.

EXISTENT GUM IN FUELS BY JET EVAPORATION, ASTM D381-IP 131

Specification

Comprises a well-lagged aluminium heating block in a stove enamelled cylindrical outer case. A stainless steel preheating coil and manifold are cast into the block in which the five wells are subsequently bored. The block is electrically heated by two elements rated at 850 and 1400W respectively. The 850W block heater operates in conjunction with the thermostat and is used on its own for the air jet method. The 1400W steam boost heater is used for the steam jet method and is left on continuously with the block heater for this method. The heaters and preheating coils are so arranged as to render the use of an external heater unnecessary. A dial type flowmeter is fitted to the air inlet.



PF-800

Supply requirements

Air	5 litres/sec at 300 gf/cm² approx.
Dry steam	5 litres/sec at 1·2 kgf/cm² approx.

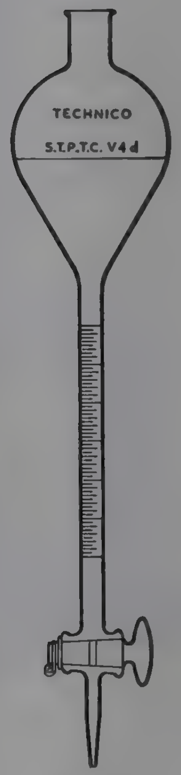
PF-800

RESIDUE ON EVAPORATION APPARATUS, 5-test, as specification, complete with 5 conical outlet adapters and 5 beakers. Total load 2250W. For 100/120 or 200/250V a.c. single phase supplies ... Each **£265·00** *fN*

When ordering please state voltage and frequency of supply.

PF-810	**Beaker**, borosilicate glass, height 75 mm high, outside diameter 51 mm	Pack of 10	**£3·00**

NEUTRAL OIL STPTC, PC4 and GB 5



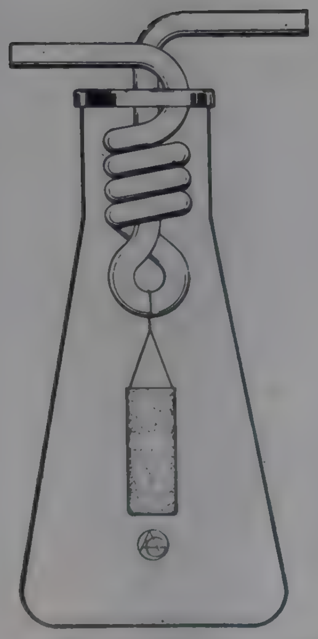
PF-880

PF-880

RECEIVERS, separating funnel, STPTC, *Technico*, **Class A.**

Schedule No.	V4d	V4e	
Stem capacity	3	1 cm³	
Each	**£3·55**	**3·55**	*a*

SEDIMENT IN CRUDE AND FUEL OILS BY EXTRACTION, ASTM D473-IP 53



Extraction assembly with PF-960 &c.

***PF-960**

CONDENSER, block-tin ... ... Each **£4·60** *m*

PF-962

THIMBLE, fused alumina, height 7 cm, diameter 2·5 cm, weighing between 15 and 17 g.
Ten **£4·90** Each **£0·55** *m*

ACCESSORIES

PF-964	**Thimble basket**	Each	**£8·00**	*f*
PF-965	**Water cup**	Each	**£0·85**	*a*
FJ-070	**Flask,** conical, wide mouth, capacity 1 litre	For details and prices see entries in List No. sequence.		
PR-680	**Wire,** platinum, 38 mm diameter (20 cm length required)			

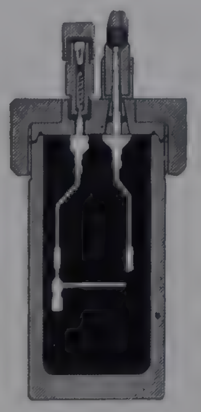
SPECIFIC GRAVITY AND DENSITY, IP 59, ASTM D1298, IP 160, ASTM D941, IP 189, ASTM D70, IP 190, STPTC V12, V14

DJ-534	**Density bottle,** with capillary stopper	
DJ-550	**Density bottle,** with capillary stopper and ground-on cap	For details and prices see entries in List No. sequence.
DJ-560	**Density bottle,** Hubbard, to STPTC Schedule V12	
DJ-780	**Pyknometer tube,** Sprengel, to STPTC Schedule V14	
DJ-790	**Pyknometer tube,** Lipkin, to IP 189	
HT-150	**Hydrometers,** to ASTM D1298, IP 160 and BS 718 Series L50SP ...	
HT-160	**Hydrometers,** to ASTM D1298, IP 160 and BS 718 Series M50SP ...	

SULPHUR IN PETROLEUM PRODUCTS by the Bomb Method, ASTM D129—IP 61,

The following components are recommended:

CB-200	**Bomb,** *Gallenkamp*, with certificate of test	For details and prices see entries in List No. sequence.	
CB-215	**Stand,** for bomb cap		
CB-220	**Pressure gauge**		
CB-225	**Bomb filling tube**		
CB-230	**Connecting tube**		
CB-234	**Spanner**		
CB-235	**Needle valve**		
PH-170	**Crucible, platinum,** 27 mm dia. × 12 mm deep with flange, weight approx. 11 g.	Price on application	*f*
PH-175	**Transformer,** for firing bombs from a.c. mains, with output rated at 8V, 64VA for 10 sec duration. Totally enclosed in steel case, with a biased 'off' switch in the primary and an earthed secondary winding with a fuse and ammeter. For 200/250V 50 Hz single phase supplies only	Each **£20·00**	*cS*
PH-180	**Ignition wire,** platinum 27 swg, 100 mm long.	Each **£1·25**	*mS*
PH-182	**Adapters,** to clamp ignition wire PH-180 to bomb electrodes	Pair **£1·65**	*bS*
PH-190	**Bath,** stainless steel, to hold bomb CB-200, during firing.	Each **£13·00**	*bS*



CB-200

SULPHUR CONTENT—Quartz Tube Method, IP 63

PH-230

COMBUSTION UNIT, 2-test, electrically heated, *Seta*. The dual furnace unit comprising a sheet metal casing, pyrometer and changeover switch, energy regulator for each furnace, and control switches. The furnaces operate at 24V supplied from stepdown transformers. A platinum/rhodium thermocouple is fitted to each furnace. Oxygen, air and vacuum lines are built into the base. There are adjustable supports to receive both types of absorption vessels. For 110/130V or 200/250V a.c. single phase supplies only. **Without glassware.**

Each **£280·00** *f*

When ordering please state voltage and frequency of supply.

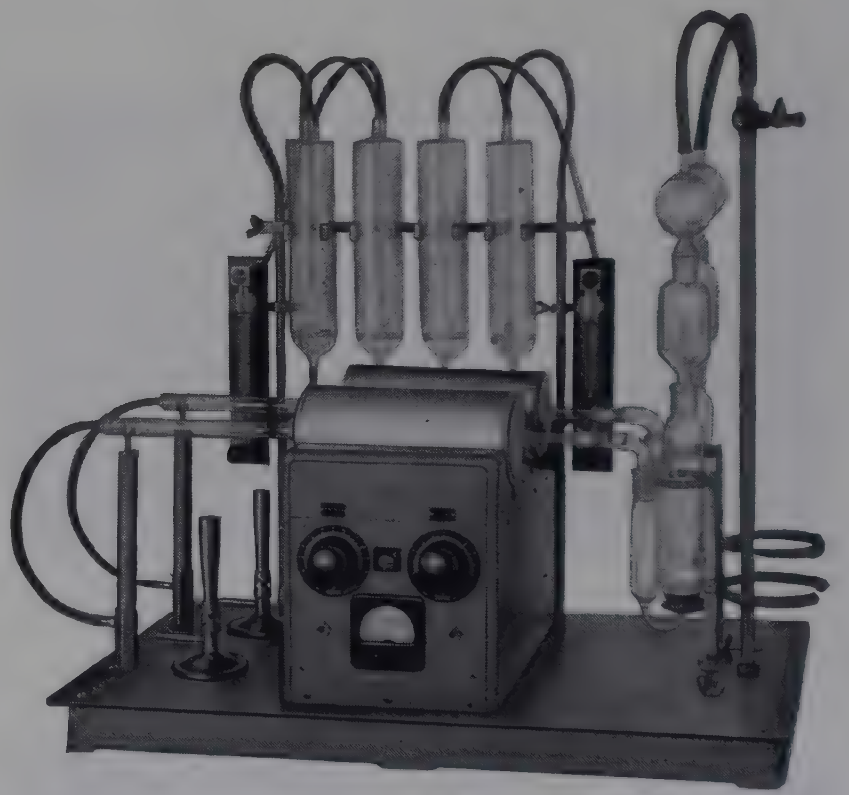
PH-245

DOUBLE SET OF IP TYPE I GLASSWARE, for PH-230, comprising two each silica combustion tubes, adapters, 90° elbows, absorbers, splash heads and four scrubbers ... ... Set **£75·00** *f*

REPLACEMENT PARTS

PH-250	**Combustion tube,** transparent silica, 540 mm long, with 19/17 socket and 14/23 cone, and section packed with quartz particles	Each **£12·00**	*f*
PH-252	**Adapter,** borosilicate glass, with 19/17 cone and nozzle for connecting to purifying train ...	Each **£1·25**	*f*
PH-254	**Elbow,** borosilicate glass, 90° angle, with 14/23 socket and 24/29 cone	Each **£1·75**	*f*
PH-256	**Absorption vessel, lower part,** borosilicate glass, with 24/29 cone and socket and No. 1 porosity sintered plate.	Each **£5·00**	*f*
PH-258	**Absorption vessel,** upper part, borosilicate glass, with 24/29 cone and socket and No. 3 porosity sintered plate.	Each **£4·00**	*f*
PH-260	**Splash head,** borosilicate glass, with 24/29 cone.	Each **£1·75**	*f*

For **FLOWMETERS** see FL-422, range 1·5–5·0 litres/min, in List No. sequence.



This illustration of PH-230 shows it fitted with type I glassware PH-245

SULPHUR CONTENT—High Temperature Combustion Method

The determination of the sulphur content of oils, greases, bitumens and similar substances can be carried out at 1350°C using a *Gallenkamp* High Temperature Tube Furnace FS-300. Full details see entry in List No. sequence.

Combustion tubes, components for purifying and absorption trains and titration apparatus see Index.

Items on this page coded S normally available from stock.

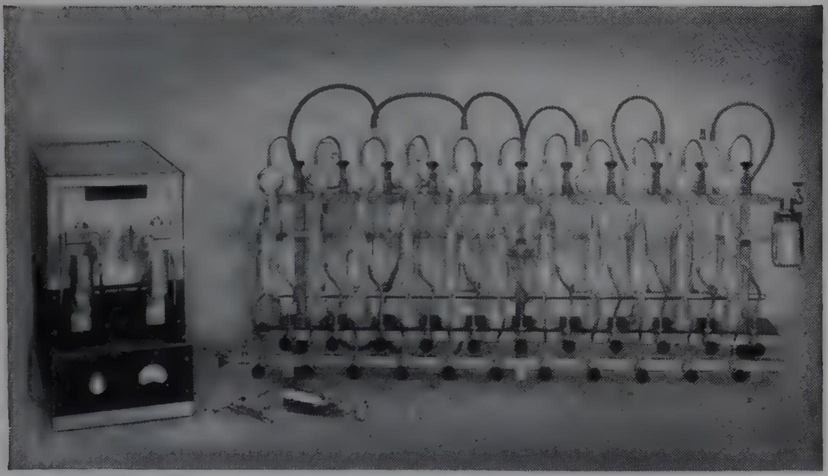
SULPHUR IN PETROLEUM PRODUCTS AND LIQUEFIED PETROLEUM (LP) GASES, Lamp Method, ASTM D1266—IP 107

PH-290

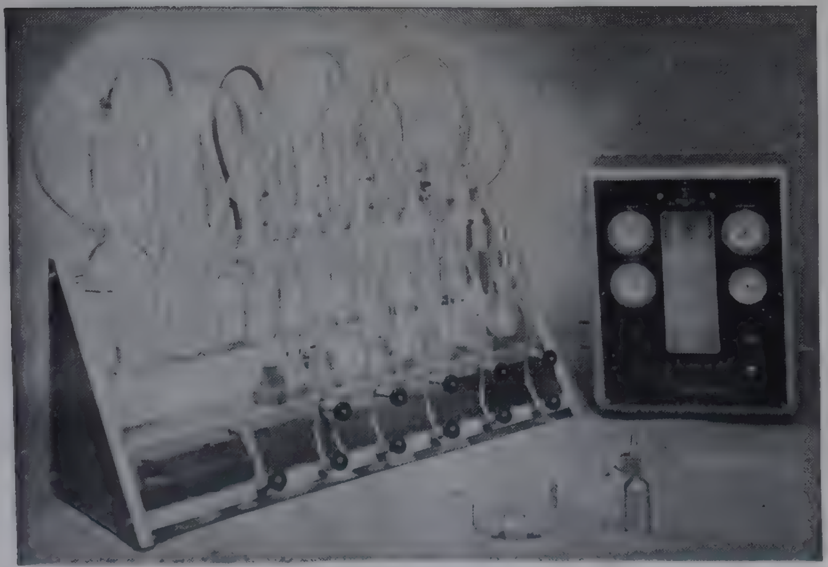
ASSEMBLY, 11-test unit, *Seta*, comprising tubular framework which acts as two manifolds for supplying natural or synthetic air for suction purposes, and needle valves for each circuit. The absorbers are supported in wooden blocks on a stainless steel platform, and all glassware is readily accessible. Two scrubbers for incoming air and three manometer type pressure regulators are supported at the rear. **Without glassware.** Each **£180·00** *f*

PH-294

GLASSWARE, complete set for 11-test unit, comprising eleven each of flasks, standard burners, chimneys, absorbers, splash bulbs, and three pressure regulators, two scrubbers and two levelling bulbs .. Set **£155·00** *f*



PH-290 with PH-294, PH-325, PH-326, PH-330



PH-296 with PH-298, PH-325, PH-326, PH-328

PH-296

ASSEMBLY, 5-test unit, *Seta*, as PH-290. **Without glassware** ... ... Each **£140·00** *f*

PH-298

GLASSWARE, complete set for 5-test unit, comprising five each of flasks, standard burners for kerosene, gasoline and similar liquids, chimneys, absorbers, splash bulbs, and three pressure regulators, two scrubbers and two levelling bulbs ... ... Set **£90·00** *f*

REPLACEMENT PARTS FOR PH-294 and PH-298

PH-300	**Burner,** standard	Each	**£2·00**	*f*
PH-302	**Chimney**	Each	**£3·50**	*f*
PH-303	**Absorber**	Each	**£4·50**	*f*
PH-304	**Splash bulb**	Each	**£1·50**	*f*
PH-306	**Pressure regulator**	Each	**£4·25**	*f*
PH-308	**Scrubber**	Each	**£11·00**	*f*

ACCESSORIES

PH-316	**Flask,** for aromatic samples	Each	**£1·50**	*f*
PH-318	**Burner,** for aromatic samples	Each	**£2·00**	*f*
PH-320	**Burner,** for LPG samples	Each	**£2·25**	*f*
PH-325	**Sampling bomb,** 100 ml, single valve model, for LPG samples	Each	**£28·00**	*f*
PH-326	**Auxiliary regulating valve** for LPG samples, with tubing	Each	**£15·00**	*f*

PH-328

SYNTHETIC AIR UNIT, *Seta*, for supplying a mixture of carbon dioxide and oxygen to the lamp sulphur apparatus. A combustion-supporting mixture of 70% CO_2 and 30% O_2 is delivered by this unit. Gases are supplied from commercial cylinders, the pressure being controlled by two single stage regulating valves. Built-in flowmeters with an illuminated panel are provided and a thermostatically controlled heater automatically governs the temperature of the CO_2 to prevent freezing. For 110/130 and 200/250V a.c. single phase supplies ... Each **£225·00** *f*

When ordering please state voltage and frequency of supply.

NOTE: In locations where CO_2 and O_2 cylinders are not readily available, purified air can be prepared by the following apparatus and used instead.

PH-330

PURIFIED AIR FURNACE, *Seta*, for supplying pure air to lamp sulphur apparatus. Comprises a U-shaped nickel chromium tube heated to 1000°C and a low voltage transformer. All terminals are water cooled and the pure air is cooled and filtered before passing to the sulphur apparatus. Load 2·5 kVA. For 110/130 and 200/250V a.c. single phase supplies ... ... Each **£480·00** *f*

When ordering please state voltage and frequency of supply.

TETRAETHYL LEAD IN GASOLINE—Chlorate Oxidation Method, IP 116

PH-390

EXTRACTION APPARATUS borosilicate glass, comprising reaction flask with stopcock, glass stirrer paddle, and side arms for graduated dropping funnel and spiral condenser ... ... Each **£15·50** *a*

THERMOMETERS, IP Standard

See TK-502 et seq. in List No. sequence.

ACIDITY (INORGANIC) OF PETROLEUM PRODUCTS — Colour Indicator Titration Method, IP 182

LEAD IN GASOLINE—Gravimetric Method, ASTM D526, IP 96

PH-400

FLASK, (AG), 2-neck, borosilicate glass, 500 ml with two 19/26 sockets, heating tube, stopcock. Complete with 250W heater winding for 230/250V supplies terminating in a connector block ... ... Each **£6·50** *bS*

PH-404

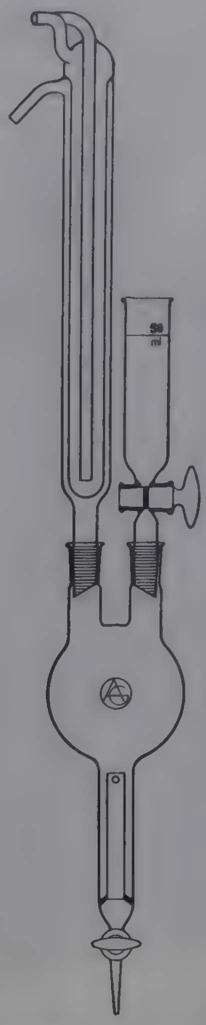
REFLUX CONDENSER, (AG), borosilicate glass, length 300 mm, with 19/26 cone ... Each **£2·40** *aS*

PH-406

TAP FUNNEL, (AG), with mark at 50 cm³ and 19/26 cone... ... ... Each **£1·70** *aS*

ED-322 **Rheostat,** enclosed pattern, to reduce heater input to about 50W, 25 × 3 cm tube, 265 ohm 1A. For price see entry in List No. sequence.

When ordering please state voltage and frequency of supply.



PH-400 to PH-406
(Heater winding
not illustrated)

VAPOUR PRESSURE—REID METHOD—IP 69 and ASTM D323

VAPOUR PRESSURE LIQUID PETROLEUM GASES IP 161 and ASTM D1267

PH-500

VAPOUR PRESSURE BOMB, *Seta,* **Reid immersion sampling type.** Comprising air chamber, gasoline chamber with one opening, bayonet coupling and neoprene gasket ... ... Each **£26·00** *f*

PH-510

VAPOUR PRESSURE BOMB, *Seta,* **Reid pressure sampling type.** Comprising air chamber, gasoline chamber with two openings, the lower section being connected through a gate valve and fitted with a needle valve ... ... Each **£38·00** *f*

REPLACEMENT PART

PH-512 Gasket, for PH-500 and PH-510. Pack of 10 **£0·50** *fS*

PH-520

PRESSURE GAUGES, test gauge quality. Chromium plated case with plastics front, and carrying handle. Ranges zero to 5, 15, 30, 45, 60, 100 or 250 lbf/in². Each **£15·00** *f*

When ordering please state range required.

PH-550

VAPOUR PRESSURE BOMB, *Seta,* **LPG type,** stainless steel. The main chamber has a bleed valve and the 20% relative capacity liquid chamber has a filling valve. Each section is tested to 1000 lbf/in² hydrostatic pressure. Each **£170·00** *f*

PH-552

VAPOUR PRESSURE BOMB, *Seta,* **LPG type,** as PH-550 but with liquid chamber 33⅓% relative capacity. Each **£175·00** *f*

PH-554 **Sampling connector,** 90 cm long, fit inlet valve of PH-550 and PH-552 ... ... Each **£8·00** *f*

PH-562

PRESSURE GAUGES, for LPG bombs. Similar to PH-520. Ranges zero to 120, 350 or 600 lbf/in². Each **£15·00** *f*

When ordering please state range required.

PH-580

THERMOSTATIC WATER BATH, *Seta,* for **6 Reid** or **4 LPG** vapour pressure bombs. With immersion heater, bimetal thermostat, electronic relay, 3-heat switch, drain tap, and constant level. Stirring is by an air bubbler. The top compartment, with hinged cover for easy access, houses the thermostat adjusting head and heater head, the relay being in a separate compartment in the base. Finished in stove enamel and mounted on castors. Power consumption 3 kW max. For 100/130, 200/220 or 220/250V a.c. single phase supplies only ... ... Each **£200·00** *f*

PH-510 with PH-520

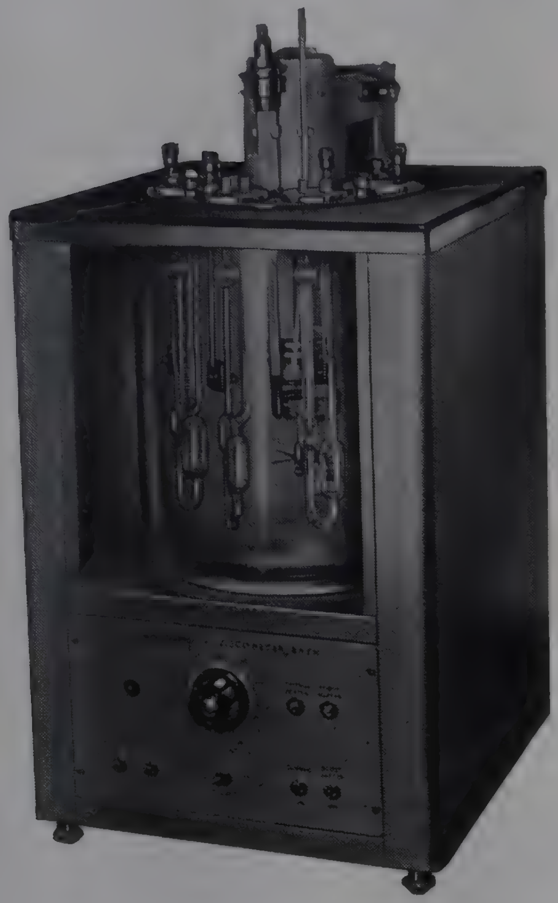
PH-500

PH-552 with PH-562

Items on this page coded *S* normally available from stock.

Gallenkamp VISCOMETER BATH

REGD TRADE MARK



VS-615 with accessories

VISCOSITY OF TRANSPARENT AND OPAQUE LIQUIDS (KINEMATIC AND DYNAMIC VISCOSITIES) ASTM D455-IP 71, BS 188

- Maximum operating temperature 120°C
- Unique turntable holder permits each viscometer to be brought to the front as required
- Convenient layout minimises operator fatigue
- Workpiece illuminated brilliantly but without glare
- Designed for easy cleaning and simple maintenance
- Built-in boost for initial heating

For full details see VS-615 in List No. sequence.

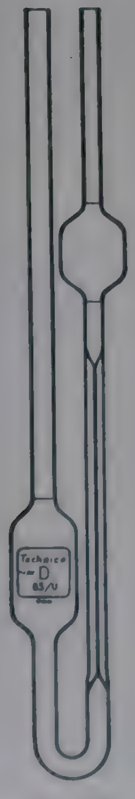
For similar Viscometer Bath for use up to 250°C see VS-670 in List No. sequence.

Technico VISCOMETERS

REGD. TRADE MARK

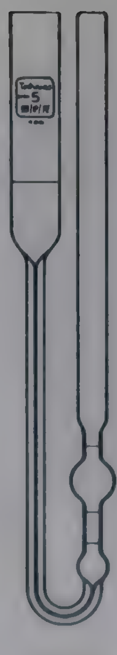
To ASTM D455—IP 71 and BS 188

- Standard U-tube



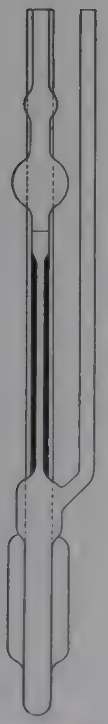
VS-220

- Reverse flow



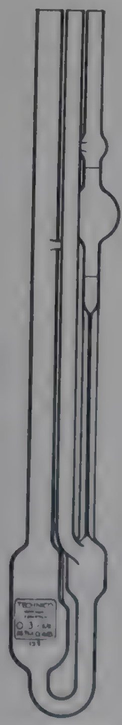
VS-250

- Suspended level



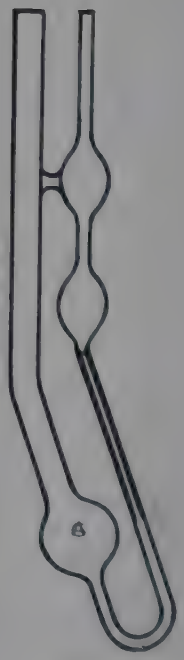
VS-280

- Ubbelohde suspended level



VS-290

- Cannon-Fenske



VS-310

For full details see entries in List No. sequence.

Gallenkamp EVT VISCOMETER

For determination of the equi-viscous temperature of road tars, pitches, bitumens, etc. to STPTC RT 3.

Reference: G. H. Fuidge, A. L. Deadman and A. L. Hutton, Chemistry and Industry, 1948, pp. 601-602.

- **EVT obtained directly, accuracy ±0·2degC**
- **Determinations independent of temperature susceptibility of tar**
- **One apparatus covers wide range of materials**
- **Only 7·5 ml sample, rapid temperature stabilisation**
- **Speedy operation, almost instantaneous readings**

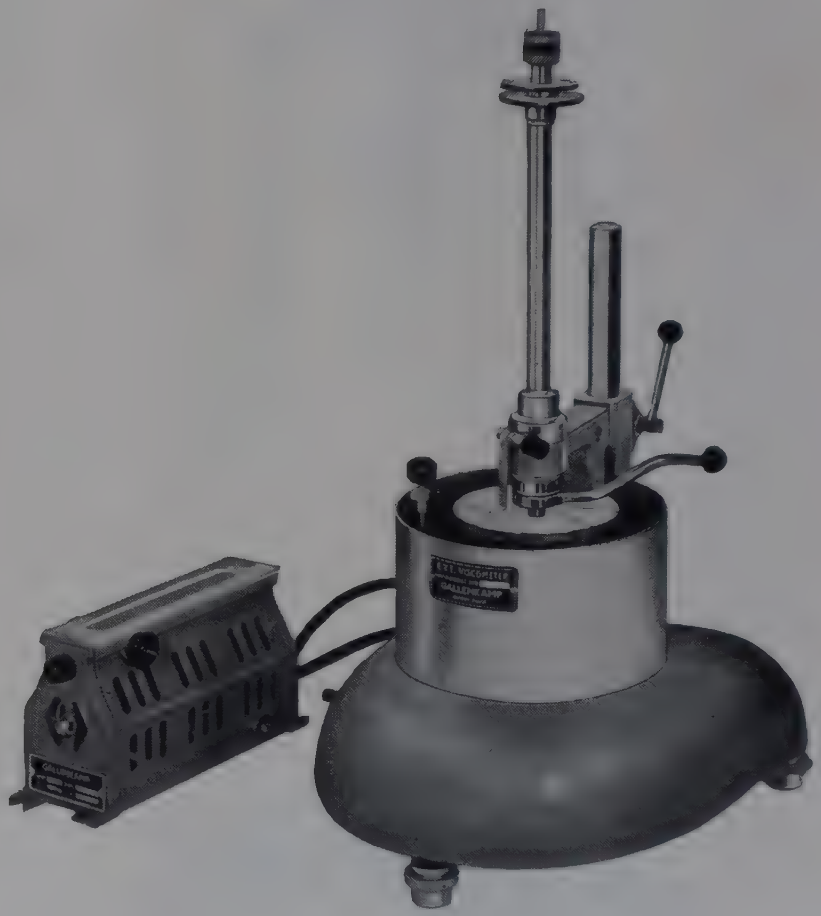
The *Gallenkamp* EVT viscometer was developed in co-operation with the South Eastern Gas Board. The equi-viscous temperature of a tar is the temperature at which the viscosity of the tar is 50 sec STV (about 200 Stokes).

SPECIFICATION

The sample is contained in a small cup in which a stainless steel cylinder, fitted with a graduated flywheel and suspended from a torsion wire, is free to rotate. The cup is completely immersed in a water bath fitted with a stirrer. The bath is heated by a clamped-on element which is controlled by a rheostat. The cylinder and suspension and the tar cup are mounted on a bracket which can slide vertically on a substantial rod attached to the main casting. The bracket can be locked in any position. The suspension can be locked by a rotating lever, and when so locked the cylinder and cup can be quickly detached for cleaning purposes without risk of damage to the torsion wire. The base is an aluminium casting fitted with levelling feet and stove enamelled. All other metal parts are chromium-plated and polished.

METHOD OF TEST

The correct quantity of sample, shown by a level gauge, is placed in the cup. The cup is fitted to the bracket and the sample then occupies the annular space between the cup and the cylinder. The suspension is lowered into the bath which is then slowly heated. The torsion head is periodically rotated sharply through 180°, stops being fitted for this purpose. The cylinder at first rotates slowly but as the EVT is approached it rotates more freely at each twist and eventually overswings by one division of the flywheel. The temperature at which this occurs is the EVT of the material.



PH-620

PH-620

VISCOMETER, EVT, *Gallenkamp*, **electrically heated,** complete with enclosed rheostat, instructions for use and certificate of calibration issued by the South Eastern Gas Board. **Without thermometer.**

For 220/240V a.c. or d.c. supplies ...	Each	**£160·00**	*b*
For 200/210V a.c. or d.c. supplies ...	Each	**£161·00**	*bN*
For 110/120V a.c. or d.c. supplies ...	Each	**£161·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

PH-622	**Heater**	Each	**£1·70**	*c*
PH-624	**Torsion wire**	Each	**£2·25**	*b*

ACCESSORIES

TJ-154	**Thermometer,** A.40C/100(STPTC T5c)	For full details and prices see entries in List No. sequence.
TJ-154	**Thermometer,** A.70C/100(STPTC T17c)	

Items on this page normally available from stock except those coded *N*.

PH-642

STANDARD TAR VISCOMETERS FOR VISCOSITY OF REFINED TAR, STPTC RT2, RT3 and VISCOSITY-CUTBACK OF BITUMEN AND ROAD OIL, IP 72

PH-642

VISCOMETER, STANDARD TAR, *Seta*, **electrically heated,** comprising water bath heated by an immersion element controlled by a protected rheostat, draincock, three legs with levelling feet, stirrer, thermometer collar and 10 mm cup and valve. For 230/250V a.c. or d.c. supplies. **Without thermometer** ... Each **£48·00** *f*

REPLACEMENT PARTS

PH-643	**Immersion element**	Each	**£6·00**	*f*
PH-644	**Cup,** with 10 mm orifice...	Each	**£12·00**	*f*
PH-645	**Valve,** for 10 mm cup	Each	**£3·00**	*f*

ACCESSORIES

PH-647	**'Go/no-go' gauge,** for checking orifice of 10 mm cup. Each **£8·00** *f*	
TJ-154	**Thermometer,** A.40C/100(STPTC T5c)	For full details and prices see entries in List No. sequence.
TJ-154	**Thermometer,** A.70C/100(STPTC T17c)	
TK-514	**Thermometer,** IP 8F Redwood low ...	
TK-515	**Thermometer,** IP 8C Redwood low ...	

RECEIVERS, 100 ml capacity see CYLINDERS.

VISCOSITY-BITUMEN ROAD EMULSION, IP 212 and BS 434

PH-660

VISCOMETER, Engler, *Seta*, **electrically heated,** comprising gold plated oil cup with stainless steel jet, mounted in a polished brass water bath. The oil cup with double walled lid is supported by an adjustable ring and the water bath with stirring device is mounted in a stand fitted with tripod legs with adjustable feet. A thermometer clip is fitted to the water bath and the oil cup lid has a thermometer socket. Supplied with plug valve for jet. **Without thermometers or flask.** For 100/130 or 200/250V a.c. supplies ... ... Each **£55·00** *f*

When ordering please state voltage and frequency of supply.

PH-662

RHEOSTAT, protected pattern ... Each **£5·00** *f*

ACCESSORIES

FK-136	**Flasks,** Kohlrausch, 200 cm^3 ...	For details and prices see entries in List No. sequence.
SE-140	**Sieves,** meshes 22 and 60 ...	
TK-640	**Thermometer,** IP 76C, two required	

PH-660

VISCOMETERS

BS Flow Cup	see	**VS-132** et seq.
Ford Flow Cup	see	**VS-140**
Universal Torsion	see	**VS-010** et seq.
Zahn Flow Cup	see	**VS-160**

VISCOSITY—REDWOOD, IP 70

PH-710

VISCOMETER, Redwood No. 1, *Seta,* **electrically heated,** for light oils of viscosity not exceeding 2000 Redwood No. 1 seconds at the time of test. Comprises copper water bath with drain cock, stirrer with thermometer collar, silver plated oil cup with agate jet, ball valve, thermometer clip and spirit level and light alloy combined draught shield and stand, fitted with levelling screws. The cup is standardised against a cup calibrated by the National Physical Laboratory and a works certificate of test is issued.

Without thermometers or flask.

For 200/250V a.c. supplies	Each	**£58·00**	*fS*
For 100/130V a.c. supplies	Each	**£58·00**	*fS*

PH-711	**Control rheostat, for PH-710**	Each	**£5·00**	*fS*

PH-710

REPLACEMENT PARTS

PH-720	**Oil cup, Redwood No. 1,** for PH-710, with works certificate of test	Each	**£25·00**	*f*
PH-724	**Immersion element,** for PH-710 ...	Each	**£6·50**	*f*

PH-740

VISCOMETER, Redwood No. 2, *Seta,* **electrically heated,** for oils of viscosity exceeding 2000 Redwood No. 1 seconds. Comprises copper water bath with drain cock, stirrer with thermometer collar, silver plated oil cup with agate jet, cover, ball valve, thermometer clip and spirit level and a combined draught shield and stand fitted with levelling screws. The cup is standardised against a cup calibrated by the National Physical Laboratory and a works certificate of test issued.

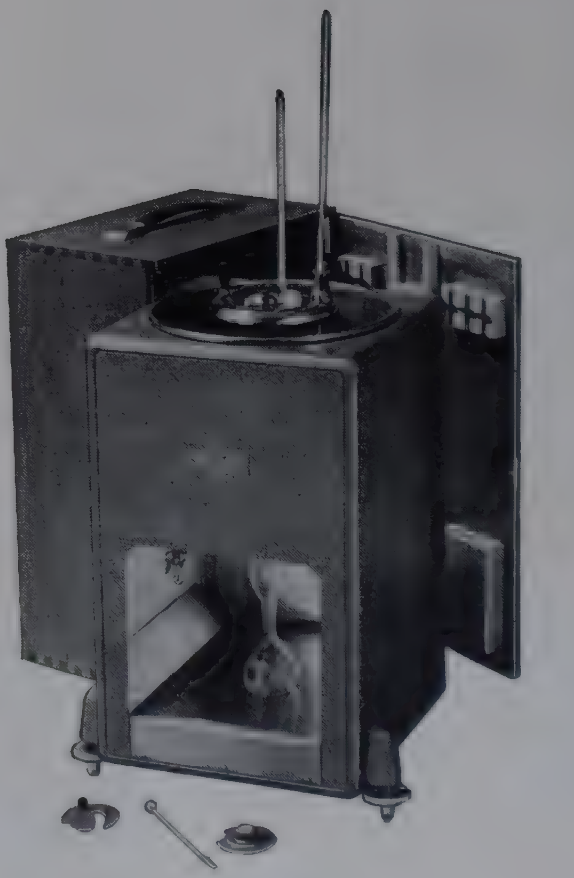
Without thermometers or flask.

For 200/250V a.c. supplies	Each	**£85·00**	*f*
For 100/130V a.c. supplies	Each	**£85·00**	*f*

PH-741	**Control rheostat, for PH-740**	Each	**£5·00**	*f*

ACCESSORIES FOR REDWOOD VISCOMETERS

FK-134	**Flask, Kohlrausch,** *Technico,* **Class B,** 50 cm³	For details and prices see entries in List No. sequence.
FK-136	**Flask, Kohlrausch,** *Technico,* **Class A,** 50 cm³	
TK-514	**Thermometer,** IP 8F, Redwood low	
TK-515	**Thermometer,** IP 8C, Redwood low	
TK-516	**Thermometer,** IP 9F, Redwood medium	
TK-517	**Thermometer,** IP 9C, Redwood medium	
TK-518	**Thermometer,** IP 10F, Redwood high	
TK-519	**Thermometer,** IP 10C, Redwood high	



PH-740

Items on this page coded *S* normally available from stock.

PH-900

WATER CONTENT—DEAN AND STARK METHOD, IP 74, BS 756 and ASTM D95

see WATER DETERMINATION.

WATER AND SEDIMENT IN CRUDE OILS AND FUEL OILS BY CENTRIFUGE, ASTM D1796—IP75, ASTM D91 and D96

PH-900

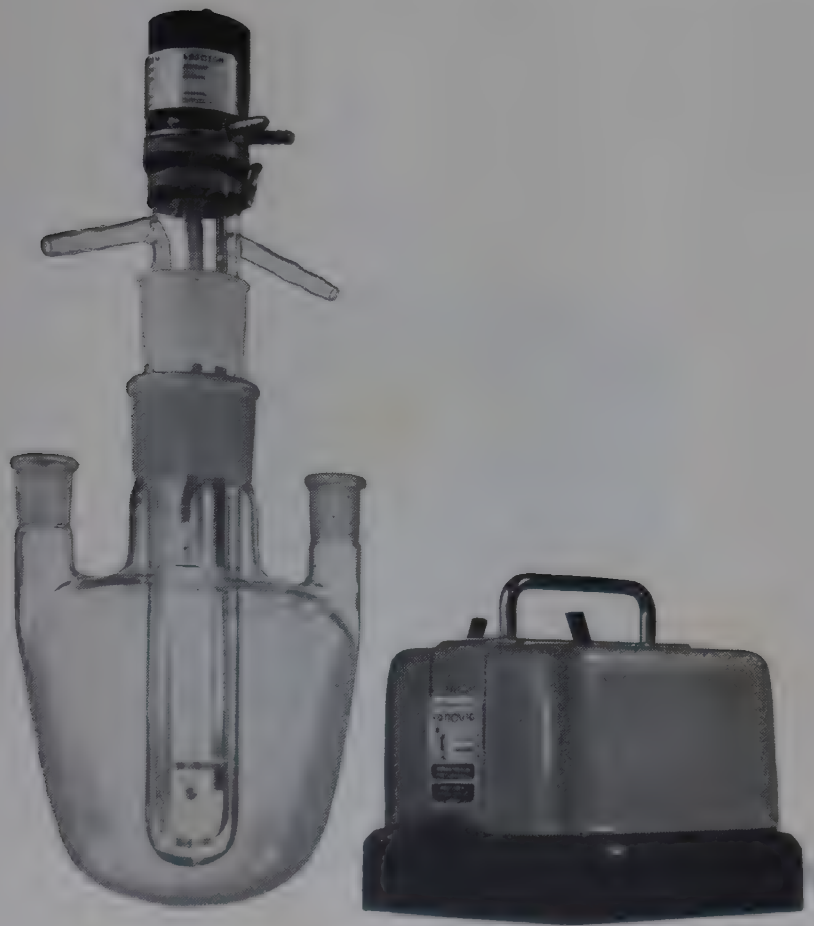
CENTRIFUGE, electrically driven, with 4-place head, totally enclosed in a spun steel guard which has a detachable lid held in place by three spring clips. Maximum speed 1500 rev/min. The 4-place head can accommodate 100 cm³ cone-shaped centrifuge tubes PH-912. For a.c. single phase supplies. With head and buckets but **without glassware.**

For 200/250V ... ... Each **£63·85** *f*
For 110/120V ... ... Each **£65·35** *f*

PH-912

CENTRIFUGE TUBE, cone-shaped, *Pyrex brand* glass, 100 cm³, graduated, to ASTM D1796–IP 75, ASTM D91, and D96 (8 in). Std. pack of 6 **£5·40** Each **£0·98** *dS*

PHOTOCHEMICAL REACTOR



PK-100

PK-100

PHOTOCHEMICAL REACTOR, 1000 ml, *Hanovia,* for small scale photochemical research using ultraviolet radiation including energy at 185 nm. A three-necked glass flask, with 45/40 centre socket and 19/26 side sockets, holds a clear quartz thimble. The latter receives an inner clear quartz thimble which contains the UV lamp. The design permits water cooling of the space between the thimbles and nitrogen flushing of the lamp chamber to eliminate ozone and other gases. Both quartz thimbles have, opposite the lamp, a 75 mm long zone in high purity synthetic silica which transmits about 80% of the UV at 185 nm for a thickness of 1 mm. A medium pressure 100W mercury arc lamp is included with electrode assembly and terminal housing, and cased control containing transformer, choke and limiting resistor with connecting lead. For 200/250V 50 Hz single phase supplies only ... ... Each **£115·00** *fS*

ACCESSORY

PK-120 **Lamp, low pressure UV,** 2W, in synthetic quartz, providing about 85% of UV output at 254 nm and 185 nm. Output at 254 nm is approximately 0·5W. Includes cased step-up transformer. For 200/250V 50 Hz single phase supplies only ... ... Each **£43·25** *f*

HIGH INTENSITY ULTRAVIOLET SOURCE
suitable for photochemical studies
See LH-560 in List No. sequence.
For other U.V. lamps see LH-530 et seq. in List No. sequence.

Items on this page coded S normally available from stock.

Technico
BS 1583
B
EX 20°C
MADE IN ENGLAND
100
cm³
10
cm³
25 cm³

Technico PIPETTES

REGD. TRADE MARK

Jets and rate of flow

All jets have a uniform taper and wall thickness giving adequate mechanical strength, and are finished by fine grinding and bevelling in accordance with the recommendations of the appropriate British Standards.

Fairly wide tolerances on rates of flow for pipettes have become accepted and specified in British Standards because they are necessary for economic manufacture by conventional methods.

Technico pipette jets however are adjusted and timed by a process which makes accurate control possible. All *Technico* pipettes have a flow time near the minimum specified and thus offer a combination of speed and accuracy.

Clearly visible permanent inscriptions

All *Technico* pipettes have inscriptions of high definition.

Robust construction

Machine drawn tubing of uniform bore and ample wall thickness is used exclusively for *Technico* pipettes. The manufacture of *Technico* bulb pipette blanks is carried out using mechanised methods which ensure a uniformly high quality at modest prices.

One mark pipettes 0·5 to 2 cm^3 Class B and 0·5 and 1 cm^3 Class A are made without bulbs in accordance with BS 1583.

Extract from BS 1583 'One-mark pipettes'

TOLERANCES ON CAPACITY						
Nominal capacity cm^3	0·5	1	2	3	4	5
Class A tolerance ±cm^3	0·005	0·007	0·01	0·015	0·015	0·015
Class B tolerance ±cm^3	0·01	0·015	0·02	0·03	0·03	0·03
Nominal capacity cm^3	10	15	20	25	50	100
Class A tolerance ±cm^3	0·02	0·025	0·03	0·03	0·04	0·06
Class B tolerance ±cm^3	0·04	0·05	0·06	0·06	0·08	0·12

Extract from BS 700 'Graduated pipettes'

TOLERANCES ON CAPACITY			
Nominal capacity	Subdivision	Class A tolerance	Class B tolerance
cm^3	cm^3	±cm^3	±cm^3
1	0·01	0·006	0·01
2	0·02	0·01	0·02
5	0·05	0·03	0·05
10	0·1	0·05	0·1
25	0·2	0·1	0·2

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PARTICLE SIZE DETERMINATION

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Technico BULB PIPETTES

REGD. TRADE MARK

With permanent graduations and inscriptions in amber stain to BS 1583
(Technical information see page 598)

PM-104

PIPETTES, *Technico*, one mark **Class B.**

To deliver	0·5 *	1 *	2 *	2·5†	3 cm³	
Dozen	£1·70	1·70	1·70	3·70	2·40	a
Three	£0·46	0·46	0·46	1·00	0·64	
Each	£0·21	0·21	0·21	0·37	0·27	

To deliver	4	5	10	15	20 cm³	
Dozen	£2·55	2·40	2·55	3·10	3·10	a
Three	£0·68	0·64	0·68	0·84	0·84	
Each	£0·28	0·27	0·28	0·33	0·33	

To deliver	25	30†	40†	50	100 cm³	
Dozen	£3·30	5·10	5·10	3·90	5·10	a
Three	£0·88	1·40	1·40	1·04	1·40	
Each	£0·34	0·48	0·48	0·39	0·48	

PM-105

PIPETTES, safety, *Technico*, one mark **Class B,** with safety bulb in suction tube.

To deliver	5	10	20	25 cm³	
Dozen	£3·70	4·10	4·80	5·10	a
Three	£1·00	1·10	1·30	1·40	
Each	£0·37	0·40	0·46	0·48	

PM-106

PIPETTES, *Technico*, one mark **Class A.**

To deliver	0·5 *	1 *	2	3	4	5 cm³	
Dozen	£5·10	5·10	5·40	6·20	6·20	5·70	a
Each	£0·48	0·48	0·51	0·58	0·58	0·53	

To deliver	10	15	20	25	50	100 cm³	
Dozen	£6·20	6·80	7·40	7·60	9·00	11·60	a
Each	£0·58	0·64	0·70	0·72	0·84	1·10	

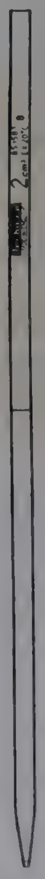
PM-107

PIPETTES, *Technico*, one mark **Class A, with works certificate of examination** stating the volume delivered and the delivery time for water.

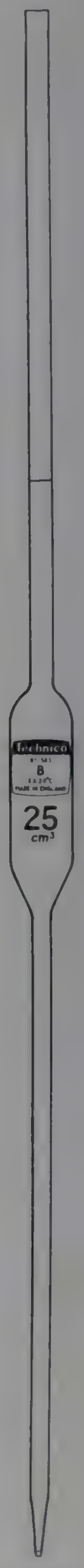
To deliver	0·5 *	1 *	2	3	4	5 cm³	
Dozen	£7·40	7·40	7·60	8·40	8·40	8·20	a
Each	£0·70	0·70	0·72	0·80	0·80	0·78	

To deliver	10	15	20	25	50	100 cm³	
Dozen	£8·80	9·60	10·40	10·60	11·80	15·50	a
Each	£0·82	0·90	0·98	1·00	1·12	1·45	

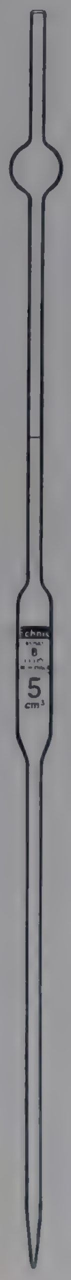
*** Straight pattern without bulb.**
† Size not included in BS 1583.



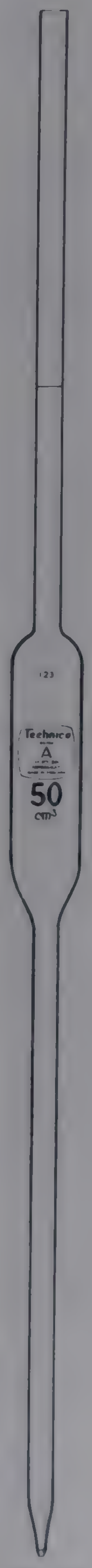
PM-104
0·5 to 2 ml



PM-104
sizes
above 2 ml



PM-105



PM-106
PM-107

All items on this page normally available from stock.

Technico GRADUATED PIPETTES

REGD. TRADE MARK

With permanent graduations and inscriptions in amber stain to BS 700

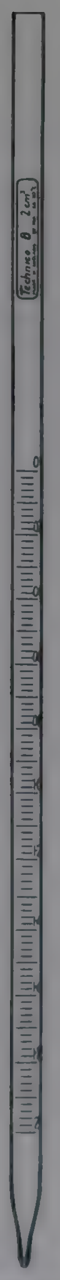
(Technical information see page 598)

PIPETTES, type 1. Calibrated for delivery from the zero line at the top, down to any graduation line. This type is intended for operation in a similar manner to a burette and **delivery should always commence from the zero line to obtain maximum accuracy.** In order to make possible the accurate control of the meniscus by this method, these pipettes have a longer delivery time than is specified for type 2.

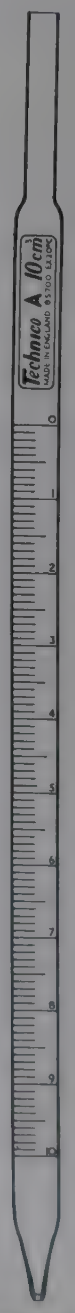
PIPETTES, type 2. Calibrated for delivery from any graduation line down to the jet, and intended for use to deliver a predetermined quantity by the same procedure as used for a one mark or bulb pipette. **Delivery should always be made down to the jet to obtain maximum accuracy.** These pipettes have a faster rate of flow than those of type 1.

PIPETTES, type 3. Calibrated to contain a given capacity from the jet up to the graduation line corresponding to that capacity. To obtain accurate transfer, the pipette should be dry before use and the contents rinsed out into the receiving vessel.

FAST DELIVERY PIPETTES. When pipettes faster than BS 700 type 2 are required we recommend ME-260 and ME-262, but the BS flow times are the fastest for which Class B accuracy can be guaranteed.



PM-344



PM-346

List No.	Capacity cm^3		1	2	5	10	25	
	Subdivided cm^3		0·01	0·02	0·05	0·1	0·2	
	PIPETTES, Type 1 for delivery from zero at top down to any graduation line.		£	£	£	£	£	
PM-344	*Technico* **Class B**	Dozen	2·90	2·85	2·90	3·30	4·00	a
		Three	0·78	0·76	0·78	0·90	1·08	
		Each	0·31	0·31	0·31	0·34	0·40	
PM-346	*Technico* **Class A**	Dozen	11·60	11·60	12·20	13·00	14·20	a
		Each	1·10	1·10	1·14	1·25	1·35	
	PIPETTES, Type 2 for delivery from any graduation line down to the jet.							
PM-364	*Technico* **Class B**	Dozen	2·90	2·85	2·90	3·30	4·00	a
		Three	0·78	0·76	0·78	0·90	1·08	
		Each	0·31	0·31	0·31	0·34	0·40	
PM-366	*Technico* **Class A**	Dozen	11·60	11·60	12·20	13·00	14·20	a
		Each	1·10	1·10	1·14	1·25	1·35	
	PIPETTES, Type 3 for content from the jet to any graduation line.							
PM-384	*Technico* **Class B**	Dozen	3·30	3·10	3·30	3·60	4·60	a
		Each	0·34	0·33	0·34	0·37	0·44	

PIPETTE SUPPORTS

FV-241	**Pipette rack, accepts up to 26 pipettes**
FV-243	**Pipette/burette rack, accepts up to 26 pipettes and 8 burettes**
SM-310	**Pipette stand, accepts up to 12 pipettes**
SM-330	**Pipette stand, accepts up to 18 pipettes**
SM-335	**Pipette support tray, accepts up to about 30 pipettes**

For details and prices of the above see entries in List No. sequence.

All items on this page normally available from stock.

COREX® PIPETTES

Gallenkamp are appointed exclusive distributors in the United Kingdom of *Corex* products manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the trademark given by Corning to laboratory glassware made from a special type of glass and treated by a chemcor ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

Corex® glassware has a much greater surface hardness than ordinary glass and is better able to resist the scratching and chipping which weaken ordinary glass and are a major cause of breakage, as well as constituting a danger from cross-contamination.

Corex ® graduations and inscriptions are as permanent as the glass itself and will remain sharply legible throughout the whole long life of the articles.

Corex® glassware is far more resistant to chemical attack than ordinary borosilicate, will withstand repeated steam sterilisation without visible clouding, and can be used up to 300°C without damage.

Any *Corex* pipette which becomes unserviceable in normal use within twelve months from date of purchase will be replaced free of charge.

VOLUMETRIC SPECIFICATIONS

Corex pipettes are manufactured to a very high quality to U.S.A. specifications which are on the whole very similar to the corresponding British Standards although there are some differences in sizes and a number of minor differences in dimensions and volumetric tolerances. In accordance with U.S.A. practice, pipettes to class A accuracy are so designated, it being understood that other pipettes without designation are class B accuracy. The limit of error applicable to each pipette is shown so that the purchaser can compare with the corresponding British Standard if desired.

***PM-430**

PIPETTES, long tip, *Corex* 7064A, with permanently marked graduations from zero line at top down to full capacity above shoulder of jet.

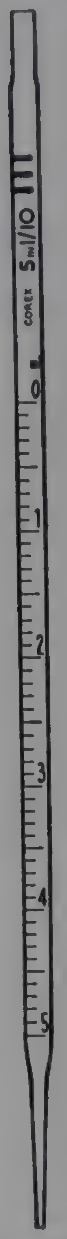
To deliver	0·1	0·2	0·5	1 cm^3	
Subdivided	0·01	0·01	0·01	0·01 cm^3	
Limit of error	0·005	0·008	0·02	0·02 cm^3	
12	**£18·50**	**19·00**	**19·50**	**18·00**	*d*
Each	**£ 1·70**	**1·75**	**1·80**	**1·65**	
To deliver	2	2	5	10 cm^3	
Subdivided	0·1	0·01	0·1	0·1 cm^3	
Limit of error	0·02	0·02	0·04	0·1 cm^3	
12	**£20·50**	**22·50**	**20·00**	**22·50**	*d*
Each	**£ 1·90**	**2·05**	**1·85**	**2·05**	

***PM-435**

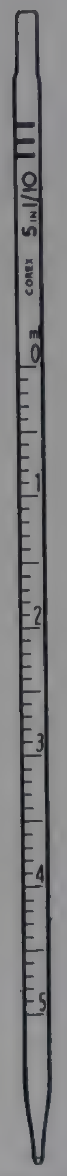
PIPETTES, Mohr type, *Corex* 7065A, with permanently marked graduations from zero line at top down to full capacity above shoulder of jet.

To deliver	0·1	0·2	1	1 cm^3	
Subdivided	0·01	0·01	0·1	0·01 cm^3	
Limit of error	0·005	0·008	0·02	0·02 cm^3	
12	**£12·50**	**13·00**	**11·75**	**13·00**	*d*
Each	**£ 1·15**	**1·20**	**1·10**	**1·20**	
To deliver	2		5	10 cm^3	
Subdivided	0·1		0·1	0·1 cm^3	
Limit of error	0·02		0·04	0·06 cm^3	
12	**£13·25**		**13·25**	**15·00**	*d*
Each	**£ 1·25**		**1·25**	**1·40**	

SEROLOGICAL PIPETTES, *Corex,* see ME-350, ME-352, ME-365 in List No. sequence.



PM-430



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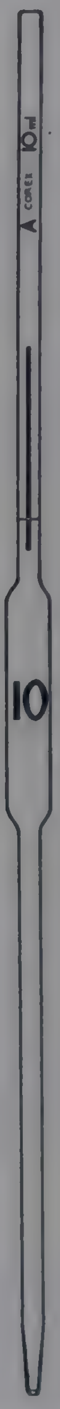


PM-460

***PM-460**

PIPETTES, transfer, Class A, *Corex* 7100A, with permanently marked graduation line and bold clear figures.

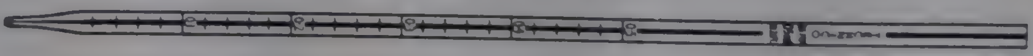
To deliver	1	2	3	4	5 cm^3	
Limit of error	0·006	0·006	0·01	0·01	0·01 cm^3	
Std. pack qty.	12	12	12	12	12	
Pack	**£14·75**	**14·75**	**14·75**	**14·75**	**14·75**	*d*
Each	**£ 1·35**	**1·35**	**1·35**	**1·35**	**1·35**	
To deliver	10	15	20	25	50 cm^3	
Limit of error	0·02	0·03	0·03	0·03	0·05 cm^3	
Std. pack qty.	12	6	6	6	6	
Pack	**£16·50**	**9·75**	**9·75**	**10·50**	**13·25**	*d*
Each	**£ 1·50**	**1·75**	**1·75**	**1·90**	**2·35**	

All items on this page normally available from stock.

Technico MICRO PIPETTES

REGD. TRADE MARK

to BS 1428 Part D4



PM-496

PIPETTES, Type 1, subdivided, calibrated for delivery from the zero mark at the top down to any graduation mark.

Type 2, subdivided, calibrated for content from the jet up to any graduation mark.

List No.	Quality					
		Capacity cm³	0·1	0·2	0·5	
		Subdivided cm³	0·005	0·01	0·02	
		Tolerance ± cm³	0·002	0·004	0·006	
PM-486	*Technico* **Type 1,** for delivery	Dozen	**£4·70**	**4·30**	**4·30**	*a*
		Each	**£0·45**	**0·42**	**0·42**	
PM-496	*Technico* **Type 2,** for content	Dozen	**£4·80**	**4·60**	**4·60**	*a*
		Each	**£0·46**	**0·44**	**0·44**	

PIPETTES, Type 3, one mark calibrated for content.

Type 4, two marks calibrated for content.

List No.		*Technico* **Type 3**				**Type 4**		
	Capacity cm³	0·005	0·01	0·02	0·05	0·1	0·2	
	Tolerance ± cm³	0·0002	0·0002	0·0004	0·001	0·002	0·004	
PM-506	Dozen	**£3·70**	**3·50**	**3·10**	**3·10**	**3·50**	**3·50**	*a*
	Each	**£0·37**	**0·36**	**0·33**	**0·33**	**0·36**	**0·36**	

PIPETTES, micro, *E-MIL*, with automatic zero caused by constriction in capillary.

Capacity	10	20	25	50	100	150	200	250 mm³	
Delivery tolerance ±	0·5	1	1	1	2	3	4	5 mm³	
Content tolerance ±	0·3	0·4	0·4	0·5	1	1·5	2	2·5 mm³	
PM-526 Calibrated for delivery									
Dozen	**£7·70**	**7·70**	**7·70**	**7·70**	**7·70**	**8·55**	**7·70**	**7·70**	*m*
Each	**£0·72**	**0·72**	**0·72**	**0·72**	**0·72**	**0·80**	**0·72**	**0·72**	
PM-536 Calibrated for content									
Dozen	**£7·70**	**7·70**	**7·70**	**7·70**	**7·70**	**8·55**	**7·70**	**7·70**	*m*
Each	**£0·72**	**0·72**	**0·72**	**0·72**	**0·72**	**0·80**	**0·72**	**0·72**	

PM-546

PIPETTES, ultramicro, *E-MIL*, Kirk pattern.

To contain	5	10	25	50	100 mm³	
Tolerance ±	0·05	0·1	0·2	0·25	0·5 mm³	
Dozen	**£8·55**	**8·55**	**9·85**	**9·85**	**9·85**	*m*
Each	**£0·80**	**0·80**	**0·92**	**0·92**	**0·92**	

PM-566

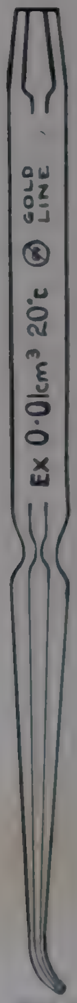
PIPETTE, MICROMETER SYRINGE, *Agla*, comprising a 0·5 cm³ all-glass hypodermic syringe attached by a rigid holder to a micrometer screw which operates the piston. The micrometer head is direct reading to an accuracy of 0·00005 cm³. The syringe is fitted with a Luer type mount and is supplied complete with two metal needles in case ... ... Each **£14·00** *f*

REPLACEMENT PART

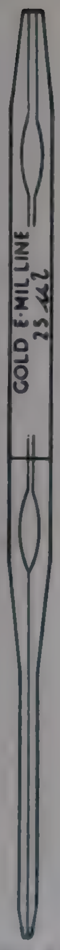
PM-568	**Glass syringe,** comprising barrel and piston, with Luer nozzle...	Each	**£4·20**	*f*

ACCESSORIES

PM-570	**Glass capillary needle,** straight pattern, Luer fitting	Each	**£0·85**	*f*
PM-571	**Glass capillary needle,** right angle pattern, Luer fitting ...	Each	**£0·85**	*f*
PM-572	**Constant drop volume nozzle**	Each	**£1·20**	*f*
PM-573	**Syringe holder,** with retort stand attachment	Each	**£3·90**	*f*
SM-610	**Bosshead,** *Technico*, for use with PM-573. For price see entry in List No. sequence.			



PM-526
PM-536



PM-546

PM-566

PM-584

DROPPING PIPETTES

PM-580

PIPETTES, dropping, ungraduated, with teats. In packs of 10.

Capacity approx.	1	4 ml	
10 packs	**£9·60**	**15·00**	*a*
Pack	**£1·08**	**1·70**	

PM-584

PIPETTE, dropping, graduated 1 cm³ in 0·1 cm³, with teat.
Ten **£2·60** Each **£0·32** *a*

All items on this page normally available from stock.

SAFETY PIPETTES

A range of pipettes the upper end of which is a hollow piston on which slides a barrel with finger vent at the top. The pipette is filled above the mark by pumping and then finger operated in the normal way.

To deliver	1	2	5	10	25 cm³	
Syringe capacity	2	2	5	10	10 cm³	
PM-624 **PIPETTES,** *Exelo,* **one mark** Dozen	£15·00	15·00	18·45	22·30	22·45	*m*
Each	£ 1·39	1·39	1·70	2·07	2·08	
PM-634 **PIPETTES,** *Exelo,* **graduated** Dozen	£17·65	17·65	20·25	24·35	25·65	*m*
Each	£ 1·63	1·63	1·88	2·26	2·27	

A range of Class B graduated pipettes fitted with standard joint 7/11 sockets at upper end which accepts a plastics adapter for any stock syringe have a Luer fitting. One syringe can be used with many pipettes. Breakage of pipette does not incur repair or loss of syringe.

PM-644

PIPETTES, graduated, *E-MIL* safety, as specification.

To deliver	1	2	5	10 cm³	
Subdivided	0·01	0·02	0·05	0·1 cm³	
Dozen	£5·80	5·80	5·05	5·05	*m*
Each	£0·54	0·54	0·47	0·47	

ACCESSORIES

PM-648 **Adapter,** plastics, 7/11 cone, with Luer fitting for syringe. Dozen £1·60 Each £0·21 *m*

SY-410	**Syringes,** all glass	For details and prices see entries in List No. sequence.
SY-430	**Syringes,** plastic	

PM-105

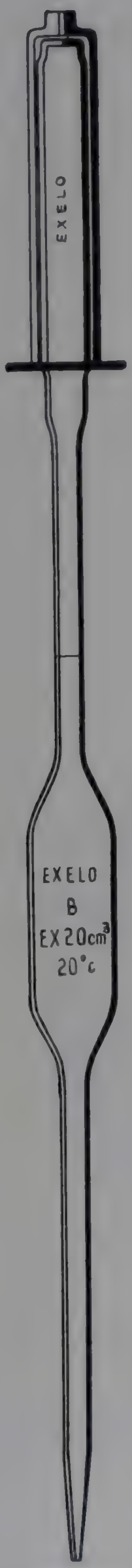
PIPETTES, *Technico,* with safety bulb in suction tube. For details and prices see entry in List No. sequence.

PIPETTE FILLER

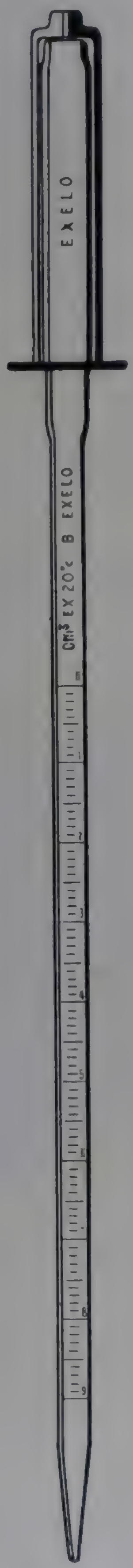
PM-660

PIPETTE FILLER, *Griffin.* Comprising a moulded rubber bulb, approx. 60 ml capacity, fitted with 3 plastics ball valves which can be precisely controlled by pressure between finger and thumb. There are no metal parts to corrode and the filler can be used for all liquids except those which attack rubber.

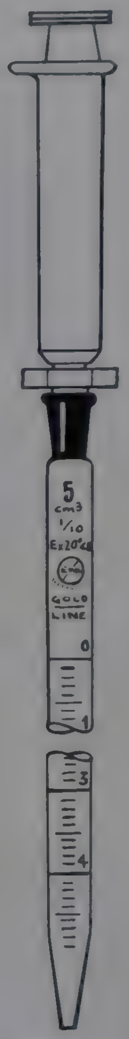
Can be used on bulb or cylindrical pipettes from 2 cm³ up to 50 cm³ capacity... Ten £8·50 Each £1·00 *m*



PM-624



PM-634



PM-644
with PM-648
and syringe

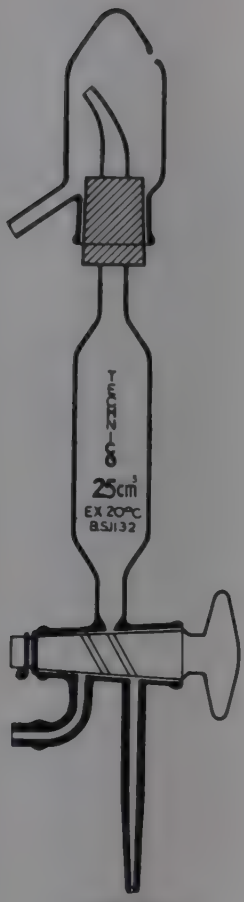
PM-660

PIPETTE STANDS	see STANDS
PIPETTE WASHING	see WASHING EQUIPMENT

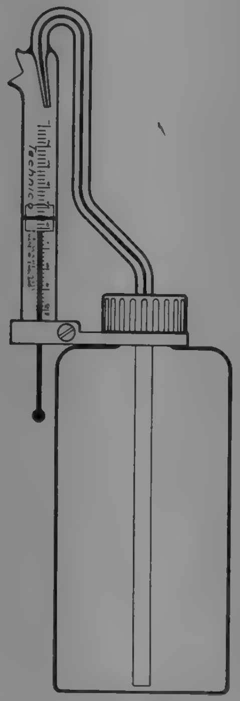
All items on this page normally available from stock.

Technico AUTOMATIC PIPETTES

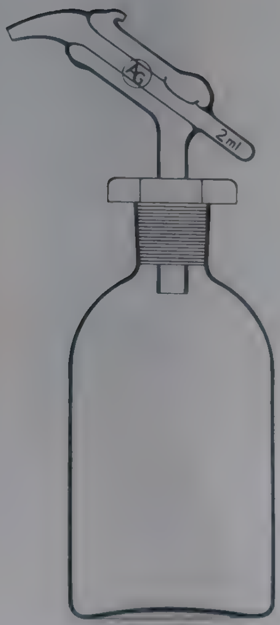
REGD. TRADE MARK



PM-664



PM-680



PM-714

PM-664

PIPETTES, Dafert automatic, *Technico,* to BS 1132, complete with overflow bulb fitted with rubber stopper. Stopcock fitted with retaining spring.

To deliver	5	10	25	50	100 cm^3	
Tolerance ±	0·06	0·08	0·12	0·15	0·25 cm^3	
Dozen	**£20·00**	**20·50**	**21·00**	**26·00**	**30·00**	*a*
Each	**£ 1·90**	**1·95**	**2·00**	**2·45**	**2·85**	

Spare retaining springs for stopcocks of above pipettes see ST-650 in List No. sequence.

PM-680

PIPETTES, AUTO-DISPENSING, *Technico.* Adjustable capacity pipettes with plastics reservoirs for the rapid dispensing of pre-set volumes of liquids. Each pipette comprises a robust precision bore graduated glass barrel fitted with a piston which can be set to any required dispensing volume. The piston head is fitted with a chemically resistant silicone rubber sealing ring. A siphon tube on the pipette provides automatic zero adjustment. The pipette is mounted on a wide based polythene bottle. By squeezing the bottle, the liquid rises in the pipette to a little above the zero mark and excess liquid is sucked back by the siphon tube when the bottle is released. The pre-set volume may then be simply poured out, the whole operation having taken only a few seconds.

Capacity	10	50 cm^3	
Subdivision	0·2	1 cm^3	
Reproducibility	0·1	0·5 cm^3	
Bottle capacity	600	1200 ml	
Dozen	**£26·00**	**37·00**	*a*
Each	**£ 2·45**	**3·50**	

REPLACEMENT PART

PM-681 **Main glass part,** with graduated barrel.

Capacity	10	50 cm^3	
Dozen	**£17·50**	**26·50**	*a*
Each	**£ 1·65**	**2·50**	

PM-704

PIPETTES, automatic tilting, for rapid dispensing of replicate volumes with approximate accuracy.

To deliver	1	2	5	10 ml	
Ten	**£8·60**	**8·40**	**8·20**	**8·60**	*a*
Each	**£0·96**	**0·94**	**0·92**	**0·96**	
To deliver	15	20	25	50 ml	
Ten	**£10·00**	**11·00**	**12·20**	**14·40**	*a*
Each	**£ 1·12**	**1·25**	**1·35**	**1·60**	

PM-714

PIPETTES, as PM-704 but fitted with a 24/29 polythene stopper suitable for fitting to any reagent bottle or flask with a 24/20 or 24/29 ground neck. Complete with 500 ml reservoir bottle.

To deliver	1	2	5	10 ml	
Ten	**£11·60**	**11·40**	**11·20**	**11·60**	*a*
Each	**£ 1·30**	**1·30**	**1·25**	**1·30**	
To deliver	15	20	25	50 ml	
Ten	**£13·00**	**14·00**	**15·20**	**17·40**	*a*
Each	**£ 1·45**	**1·55**	**1·70**	**1·95**	

All items on this page normally available from stock.

AUTOMATIC DISPENSING PIPETTES

PM-754

PIPETTES, AUTO DISPENSING, *Quickfit*, for the rapid dispensing of preset volumes of liquids. The pipette delivers when the syringe plunger is depressed and refills automatically when the plunger is released. The volume dispensed is set by a simple screw clamp. Suck-back is prevented by a glass non-return valve and the liquid contacts only glass, PTFE and polypropylene components. Supplied complete with 750 ml amber glass reservoir bottle.

Capacity	5	10 cm^3	
Type No.	5DA	10DA	
Each	£9·00	9·25	*f*

PM-754

PM-765

LIQUID DISPENSER, automatic, *Auto-Spenser*, comprising a standard 5 cm^3 or 10 cm^3 glass syringe with ptfe plunger, driven by a synchronous motor. Delivery is adjustable either from 0·5 to 5 cm^3 or 0·5 to 10 cm^3 with a reproducibility within ±0·1%. A Delrin valve ensures that no liquid flows back into the syringe and a Perspex window permits the syringe mechanism to be seen in operation. Liquid inlet and outlet nozzles, a press button for single cycle operation and an adapter for foot switch accessory are provided. Overall dimensions 23×10×10 cm. Weight 1·6 kg. Complete with one glass syringe, and instructions for use. For 220/240V 50 Hz supplies.

Syringe capacity	5	10 cm^3	
Each	£27·50	27·50	*f*

REPLACEMENT PARTS AND ACCESSORIES

PM-766	**Foot switch assembly**	Each	**£3·75**	*fN*

PM-769 **Syringes,** glass with ptfe plunger.

Capacity	5	10 cm^3	
Each	£1·95	2·20	*m*

OUTLET
INLET

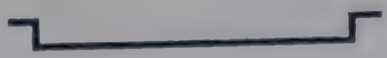
PM-765

PLANCHETS

PP-100

PLANCHET, flat aluminium source tray for lead castles. Overall dia. 26 mm, inside dia. 23 mm, depth 1·75 mm.

In pack of 100	10 packs	£9·00	*m*
	Pack	£1·00	

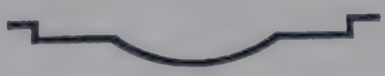


PP-100

PP-104

PLANCHET, as PP-100 but dimpled. In pack of 100.

10 packs	£9·00	*m*
Pack	£1·00	



PP-104

Items on this page normally available from stock except those coded *N*.

PLANIMETERS

PP-220

PP-220

PLANIMETER, Allbrit, fixed index pattern, with fixed length tracer arm covering maximum radial range of 22 in. In case with hand magnifier, checking rule and instructions leaflet ... ... Each **£29·60** *f*

PP-240

PLANIMETER, Allbrit, sliding bar pattern, with measuring wheel carriage adjustable for different bar lengths to give direct readings independent of scale. The bar is engraved with an arbitrary scale and settings are made by a vernier, fitted with a fine adjustment, attached to the measuring wheel carriage. In case with adjustable magnifier, calibration table and instructions.
Each **£35·75** *f*

PLASTICS MATERIALS

General properties of common synthetic resins. (Common names and abbreviations in accordance with BS 3502).

Apart from their susceptability to chemical attack, plastics can also be very sensitive to their environments. Strong sunlight or low concentrations of organic vapours can be sufficient to cause superficial crazing or even complete failure, usually along undetectable lines of internal strain. Most often affected in this way are acrylic, polystyrene, and polythene but generally this potential disadvantage is outweighed by the advantages of mechanical strength and low price.

Type of resin	Usual mechanical properties and appearance	Approx. max. working temp. °C	Flammability	Sterilisation		Attacking reagents	
				Air at 160°C	Steam at 121°C	Water, acids and alkalis	Common organic solvents
Polythene, low density	Flexible, opaque	90	Slow burning	No	No	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons particularly above 60°C
Polythene, high density	Semi-rigid, opaque	110	Slow burning	No	No	Oxidising acids (conc.)	
Polypropylene	Rigid, translucent	140	Slow burning	No	Yes	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons particularly above 80°C
TPX (polymethylpentene)	Rigid, clear or pigmented	180	Slow burning	Yes	Yes	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons
PVC, rigid (vinyl)	Rigid, pigmented	70	Self extinguishing	No	Some grades	None	Ketones, cyclic ethers, chlorinated hydrocarbons and deplasticising solvents
PVC, plasticised (vinyl)	Very flexible, clear or pigmented	50	Self extinguishing	No	Some grades	Slight water absorption	
Polystyrene	Brittle, clear	85	Slow burning	No	No	Oxidising acids (conc.)	Most
Acrylic (Perspex, PMM)	Rigid, brittle, clear	70	Slow burning	No	No	Conc. acids	Ketones, esters and chlorinated hydrocarbons
Polycarbonate	Rigid, clear	130	Very slow burning	No	Yes	Conc. acids and alkalis (slight attack)	All except aliphatic hydrocarbons
Nylon (Polyamide)	Rigid, opaque	120	Self extinguishing	No	Yes	Water (absorbed) and acids	Phenols
Ptfe	Rigid, opaque	300	Non-flammable	Yes	Yes	None	None
Melamine	Rigid, pigmented	110	Non-flammable	No	No	Conc. acids and alkalis	None

All items on this page normally available from stock.

PLASTICS SUNDRIES

(All dimensions given are nominal)

See also entries under page heading Rubber and Plastics Sundries

SEALING MATERIALS

PP-495

SEALANT, silicone rubber. A silicone compound which cures at room temperature to a rubber suitable for sealing purposes and for making flexible joints between glass components. The cured rubber is flexible between −60 and +300°C. Supplied in collapsible tube containing 85 g ... ... Each **£0·85** *m*

PP-522

SEALING TISSUE, *Gallenkamp Parafilm*, a flexible, single-way stretch, waterproof, thermoplastic material formulated for use in a wide range of ambient temperatures. Once wrapped round an article, it can be sealed into position by the heat and pressure of the hand. It can be used to seal irregularly shaped articles thus protecting the contents from contamination. *Parafilm* is resistant to most common acids, alkalis and inorganic solutions and it has a low water vapour permeability. In 15 metre rolls, interleaved with paper to prevent sticking. Each roll is individually sealed and wrapped.

Width	5	16·5	50 cm	
10 rolls	**£3·50**	—	—	*b*
3 rolls	**£ —**	**3·50**	**10·00**	
Roll	**£0·41**	**1·25**	**3·50**	

***PP-524**

SEALING TISSUE, *Parafilm M*, similar to PP-522 but having two-way stretch properties. In rolls interleaved with paper to prevent sticking.

Width	10	50 cm	
Length	38	7·5 metres	
Roll	**£2·40**	**£2·40**	*m*

PP-525

SEALING TAPE, ptfe, which can easily be stretched over stoppers and ground joints or the mouths of tubes, bottles etc., to form chemically inert closures. The tape can be sterilised in steam. In 10 metre rolls.

Width	5	10 cm	
Roll	**£1·60**	**3·20**	*c*

POLYTHENE FILM

PP-532

FILM, polythene, 500 gauge, 0·13 mm thick, for airtight wrapping and storage of chemicals, instruments and general apparatus.

Width	120	180 cm	
10 metres	**£1·00**	**1·20**	*c*
Metre	**£0·17**	**0·19**	

POLYTHENE FILM ENVELOPES

PP-540

ENVELOPES, polythene film, 150 gauge, 0·04 mm thick. These envelopes have many uses in the laboratory and can be hermetically sealed with a hot iron. In packs of 100.

Size	7·5×12·5	10×15	12·5×20 cm	
10 packs	**£2·20**	**1·90**	**2·20**	*c*
Pack	**£0·28**	**0·25**	**0·28**	
Size	17·5×23	20×30	25×38 cm	
10 packs	**£2·90**	**3·80**	**5·50**	*c*
Pack	**£0·35**	**0·44**	**0·62**	

For suitable sealing iron see PP-770 in List No. sequence.

PP-544

BAGS, polythene film, re-sealable. These bags are made with a rim/channel sealing device which can be closed by finger pressure and reopened repeatedly. The closure (on the shorter dimension of the bag) is reasonably dustproof but not guaranteed airtight. With write-on panel. In packs of 100.

Size	9×11·5	10×14	12·5×18·5 cm	
10 packs	**£6·20**	**7·80**	**10·60**	*c*
Pack	**£0·70**	**0·88**	**1·18**	

POLYTHENE POWDER

PP-560

POWDER, polythene, high density, white, for applying protective coatings. The article to be coated should be pre-heated to temperatures between 170 and 300°C and rolled in the powder. Any loose dust is shaken off and the surface then fused to a smooth coat at 170°C. In pack of 500 g.
Ten packs **£6·80** Pack **£0·76** *b*

NOTE: This material is suitable for the preparation of pressed polythene disks for Infrared Spectroscopy as described by B. Smethurst and D. Steele in Spectrochimica Acta 1964. **20(²) 242.**

SHEET

PP-620

SHEET, cellulose acetate, non-inflammable, in sheets, size 135×60 cm. Thickness 0·4 mm ... Each **£1·30** *m*

PP-624

SHEET, Perspex, colourless transparent. In rectangular pieces 75×50 cm.

Thickness	3	5	6 mm	
Each	**£1·60**	**2·10**	**2·60**	*m*

PP-630

SHEET, polythene, porous. Average pore size 50 microns. Suitable for gas or liquid filtration or dispersion and as a support plate in chromatography columns. Can be cut and welded. Sheet size 25×25×0·2 cm.
Each **£0·65** *c*

ADHESIVE TAPES

PP-740

TAPE, cellulose, transparent, for sealing, masking, fastening and strengthening. In 30 metre roll 2·5 cm wide on 2·5 cm dia. core ... ... Roll **£0·30** *c*

PP-744

TAPE, PVC, transparent, a thin flexible tape of high chemical resistance. For masking, protecting and sealing. In 30 metre roll on 2·5 cm dia. core.

Width	1·9	2·5 cm	
Roll	**£0·33**	**0·35**	*m*

PP-748

MASKING TAPE, a robust corrugated paper adhesive tape which is easily removed after use. Applications include masking, binding, wrapping and labelling. In 55 metre roll 2·5 cm wide ... ... Roll **£0·45** *c*

PLASTICINE

PP-760

PLASTICINE, a plastic moulding clay useful for many purposes in the laboratory.
10 lbs **£2·00** 1 lb **£0·26** *c*

All items on this page normally available from stock.

PP-770

SEALING IRON, for sealing polythene and other plastics films. A 30W element heats a shaped sole adequately to form 3 mm wide seals between two films of polythene at about 2 cm/sec. The films to be welded are placed between two layers of barrier tape and the iron is drawn across the surface of the upper layer. Supplied with mains cable, roll of barrier tape which may be re-used many times and a handy rest which can be screwed to the bench to protect the latter from the heat of the iron. For 230/250V supplies ... ... Each **£4·55** *m*

REPLACEMENT PART

PP-772 Barrier tape ... ... Roll of 1 m £0·95 *c*

PP-770

PP-780

***PP-780**

WELDING TORCH, for welding polythene, PVC or other thermoplastics. The torch operates on bottled butane or propane gas and the combustion gases serve as the heat vehicle for welding. This avoids the necessity of having a compressed air or nitrogen supply and the torch is easier to manipulate with only one gas hose. The torch is fitted with a gas control valve and must be used with a regulator giving a gas pressure of 1 kgf/cm². Supplied complete with four interchangeable jet tubes, 2 metres flexible hose with unions, two spanners and detailed instruction manual ... ... Each **£12·00** *m*

ACCESSORY

GD-531 Pressure regulator with inlet for propane gas cylinders. For price and details see entry in List No. sequence.

PP-792

WELDING ROD, polythene, 3 mm diameter. In coil of 90 metres ... ... Each **£2·00** *m*

PLATES

PR-310

PLATES, unglazed porous porcelain, circular with shallow rim. For drying crystals, etc. In packs of 10.

Top dia.	10	15 cm	
10 packs	**£22·00**	**37·00**	*c*
Pack	**£ 2·45**	**4·20**	

PR-346

PLATES, white ceramic, square, edges smooth and bevelled. Thickness approx. 6 mm. In packs of 5

Side	10	15 cm	
10 packs	**£1·90**	**3·80**	*c*
Pack	**£0·26**	**0·44**	

PR-350

PLATES, *Vitreosil* unglazed translucent silica, 10 cm square, approx. 3 mm thick ... ... Each **£1·20** *m*

PR-355

PLATE, spot test, *Royal Worcester* porcelain, glazed, with twelve cavities. Dimensions 11·5×8·5 cm.

Each **£0·45** *d*

PR-365

PLATE, spot test, rigid PVC, white, with twelve cavities. Dimensions 11·5×9·5 cm.

Ten **£1·70** Each **£0·24** *m*

SINTAGLASS **PLATES**

Porosities 0 to 4
Diameters 10 to 40 mm

For details and prices see SF-500 et seq. in List No. sequence.

PLATINUM

All platinum goods listed throughout this catalogue and the platinum foil and wire listed below are sold according to the current market price of platinum.

PR-660

PLATINUM FOIL. Width 25 mm, thickness 0·05 mm.

Per cm length **£1·50** *c*

***PR-680**

PLATINUM WIRE.

Thickness	0·127 0·005	0·229 0·009	0·305 0·012	0·381 0·015	0·508 mm 0·020 in	
Per 10 cm	**£0·25**	**0·40**	**0·60**	**0·90**	**1·70**	*m*

Thickness	0·635 0·025	0·762 0·030	0·889 0·035	1·015 mm 0·040 in	
Per 10 cm	**£2·30**	**3·25**	**4·75**	**6·25**	*m*

CX-570

PLATINUM-IRIDIUM WIRE, 10% platinum alloy, 0·5 mm dia.

For price see entry in List No. sequence.

CX-560

WIRE HOLDER, for wire up to 0·635 mm dia. For details and price see entry in List No. sequence.

PLATINUM, basins see BASINS
PLATINUM, crucibles see CRUCIBLES

All items on this page normally available from stock.

POLARIMETERS

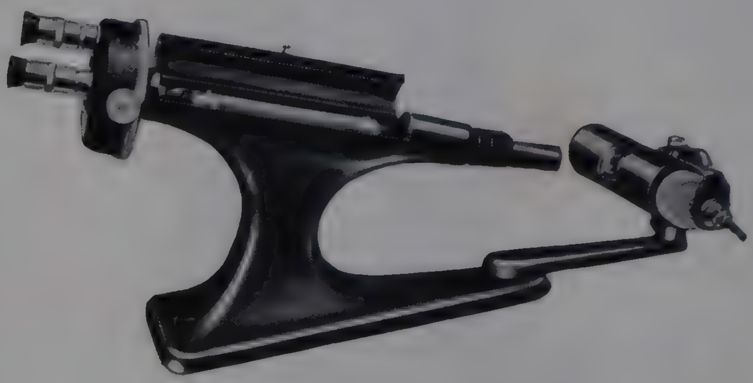
Polarimeter Model D

For testing sugar solutions and other optically active liquids

PRINCIPLE

The polarimeter comprises a pair of polarisers arranged in line, one of which can be rotated with respect to the other, the amount of rotation being measured by a divided circle. When the polarising planes are mutually perpendicular, no light is transmitted but, on introduction of a tube containing optically active liquid, transmitted light is seen to an extent measured by the rotation of one polariser to a position where light is no longer transmitted.

The instrument is fitted with 10 cm diameter glass circle which has a 360° angular scale and a sugar scale subdivided in degrees. Further subdivision is by means of a divided drum which enables the angular scale to be read to 0·05 and the sugar scale to 0·1°. The instrument takes tubes up to 220 mm length and is intended for use with sodium light, a suitable filter being included in the optical system.



PS-430 with lamp PS-475

PS-430

POLARIMETER, *B & S,* **Model D2,** as specification, with angular and sugar scales and one 200 mm tube PS-512 ... ... Each **£150·00** *f*

PS-435

POLARIMETER, *B & S,* **Model D4,** as specification, with angular and sugar scales, front focusing and one 200 mm tube PS-512 ... ... Each **£150·00** *f*

ACCESSORIES

LH-400	Sodium lamp, *Gallenkamp*, bench mounting	For details and prices see entries in List No. sequence.
PS-475	Sodium lamp, for mounting on base of PS-430 and PS-435 ...	
PS-510 to PS-518	Polarimeter tubes	

POLAROGRAPH see ELECTROCHEMICAL ANALYSIS

Polarimeter Model A

A modern and accurate instrument which can be used in the ultra-violet region and for rotary dispersion measurements with specific accessories as well as for the normal polarimetric work.

The instrument is fitted with a glass circle carrying the dividing line which is etched indelibly into the glass and with its vernier, readings to 0·01° can be made. The observation telescope does not rotate with the circle which is of great advantage when making rotary dispersion measurements. The Lippich design polariser has a variable half shadow adjustment.

PS-450

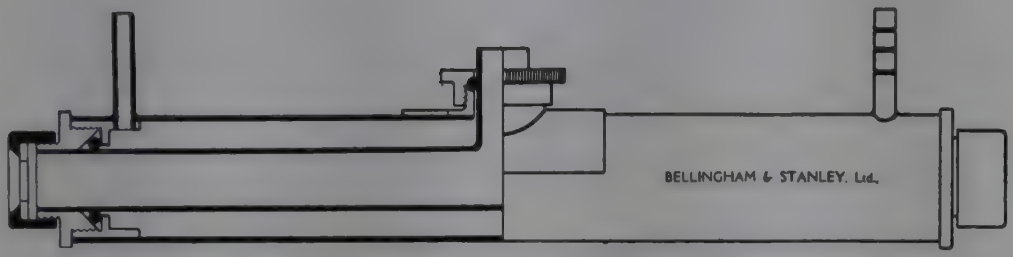
PS-450

POLARIMETER, *B & S,* **Model A No. P1,** as specification, for tubes up to 400 mm length, reading by double vernier to 0·01°. Fitted with variable half shadow polariser adjustment. **Without tube** ... ... Each **£300·00** *f*

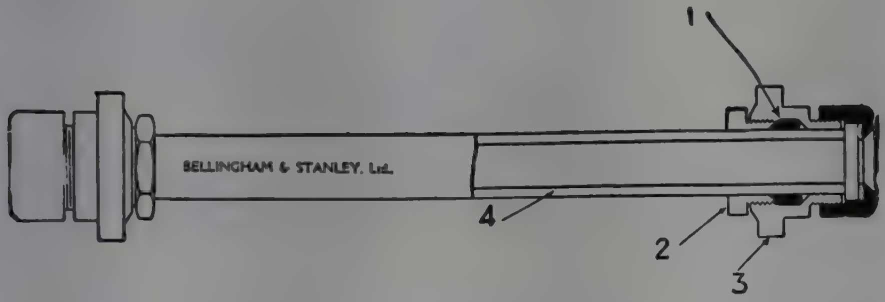
ACCESSORIES

PS-475	Sodium lamp, 45W, with jacket and transformer, for mounting on base PS-430, PS-435 and PS-450. **When ordering please state for which polarimeter.**	Each £35·00 *f*
LH-400	Sodium lamp, *Gallenkamp*, bench mounting	For details and prices see entries in List No. sequence.
PS-510 to PS-518	Polarimeter tubes	

POLARIMETER TUBES



PS-510



PS-512

1. Packing gland
2. Clamping nut
3. Hexagonal end piece
4. Easily renewable tube

PS-510
POLARIMETER TUBES, cementless, water jacketed tubes for inversion measurements.

PS-512
POLARIMETER TUBES, glass, non-rolling observation tubes with hexagonal detachable ends.

PS-514
POLARIMETER TUBES, glass, non-rolling observation tubes, with bulb for bubble.

PS-516
POLARIMETER TUBES, with straight centre filler.

PS-518
POLARIMETER TUBES, with cup shape centre filler.

List No.	PS-510	PS-512	PS-514	PS-516	PS-518	
Tube length mm	Each	Each	Each	Each	Each	
	£	£	£	£	£	
100	20·00	2·70	3·00	3·50	4·00	*f*
200	20·00	2·70	3·00	3·50	4·00	*f*
400	22·50	3·00	3·30	4·00	4·50	*f*

REPLACEMENT PARTS

PS-520	**Glass disks,** diameter 15·5 mm.	Ten	**£3·33**	*f*
PS-525	**Rubber washers,** diameter 15·5 mm.	Ten	**£0·21**	*f*

Gallenkamp

SODIUM LAMP

LH-400

- **45W discharge tube**
- **Height of aperture adjustable**
- **Transformer in ventilated base**

For full details and prices see LH-400 in List No. sequence.

POLAROID

PS-560
POLAROID SHEET, flexible plastics, 7·5 cm square, for laboratory experiments and demonstrations, giving a high and uniform degree of polarisation. The squares can be trimmed easily with scissors or a sharp blade.
Each **£1·00** *m*

PS-565
POLAROID FILTER, mounted between plane glass disks of 45 mm diameter, for applications where a high optical quality is required, giving a uniform degree of polarisation Each **£3·40** *m*

Other size squares and other diameter disks are available, details and prices on application.

All items on this page normally available from stock.

HYDRAULIC PRESSES

Total load 10 tons

APPLICATIONS

These presses are suitable for tests, such as crushing, breaking, extrusion, compression, flow and shearing tests, pressure-temperature moulding tests and spring testing, fatty acid determinations, oil content of seeds and extraction control.

CONSTRUCTION

The robust steel press is a self-contained bench type instrument with hand pump and oil storage for the built-in ram. The rising platen has a drainage groove and a delivery pipe for expressed liquids. The head of the press is adjustable for height and can be set in the most convenient position. A two-part handle 75 cm long is fitted, the short handle being used for rapidly closing the press. By adding the extension, the force can be slowly increased by making short pumping strokes.

PRESSURE MEASUREMENT

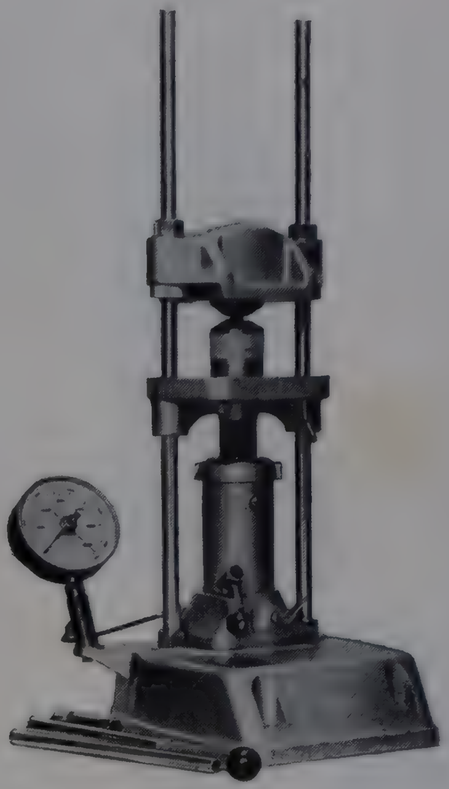
An inclined pressure gauge is fitted and has direct reading scales for total load and hydraulic pressure, a maximum pressure indicator and a zero reset device. Range covered is 0 to 22,000 lb in 44 divisions.

DIMENSIONS

Platens	6×7 in (15×18 cm)
Hydraulic lift	6 in (15 cm)
Overall dimensions	37×17×18 in (94×43×46 cm)

PU-020
PRESS, hydraulic, Model A1, as specification, with two columns ... ... Each **£170·00** f

PU-025
PRESS, hydraulic, Model A14, as specification, with four columns for more accurate alignment of the platens. Each **£186·00** f



PU-020 with PU-040

ACCESSORY EQUIPMENT

FOR CRUSHING TESTS

PU-040
PLATES, SWIVEL BEARING, for providing a uniform load for crushing tests. These plates are carried on the head of the press and swivel on a hardened steel ball. A single plain bearing plate locates on the lower platen. All the plates have centring lines on their faces for positioning the specimen and are removable. Set **£17·00** f

FOR PLASTICS, RUBBER AND HOT PRESSING

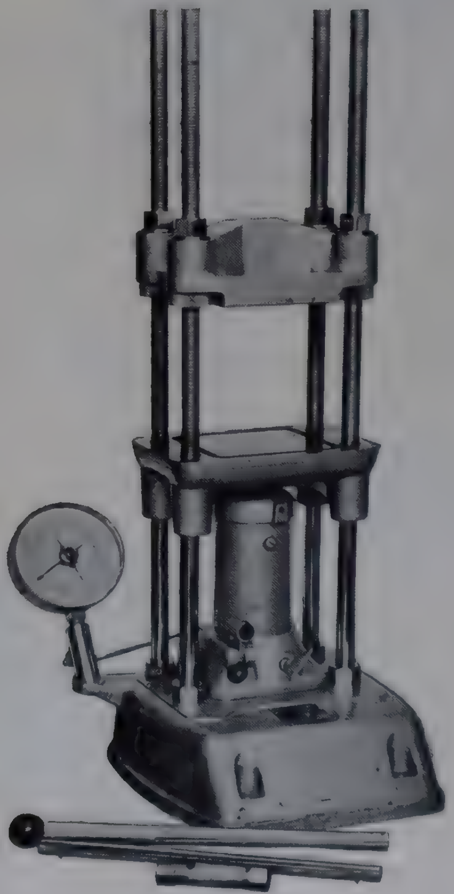
For hot pressing work in plastics moulding, laminated board production, test cures of rubber mixes, and similar applications, the press can be fitted with hotplates PU-055.

PU-055
HOTPLATES, electrically heated, 15×15 cm, temperature controlled up to 200°C by an external controller which can be mounted on the press. For 220/240V a.c. single phase supplies ... ... Set of two **£100·00** f

REPLACEMENT PART
PU-056 Heating elements ... ... Set **£6·30** f

ACCESSORY
PU-076 Thermometer, with 7·5 cm scale in brass case, angle type, 0 to 200°C ... ... Each **£5·00** f

Accessory equipment continued overleaf.



PU-025

PRESSES, Botanical	see	BIOLOGICAL SCIENCES
, Cork	see	CORK ACCESSORIES
, Filter	see	FILTER PRESS
, Metallurgical	see	METALLURGY

ACCESSORY EQUIPMENT

For PU-020 and PU-025 continued

FOR SEPARATION OF LIQUIDS FROM SOLIDS

PU-080

PERFORATED CAGE, for use with **fibrous and hard materials,** capacity 1150 ml. Constructed with drainage channels directing the liquid to a groove in the rising table. With plunger, cast-iron ejector, three perforated plates and three felt pads ... Set **£77·00** *f*

PU-085

PLATE AND CLOTH, for use with **pulpy materials,** comprising six drainage plates, twelve filter cloths and one 5 in (12·5 cm) former used to make uniformly square cakes of material ... ... Set **£13·75** *f*

FOR EXPRESSION OF LIQUIDS,

and extrusion tests, briquetting and moulding.

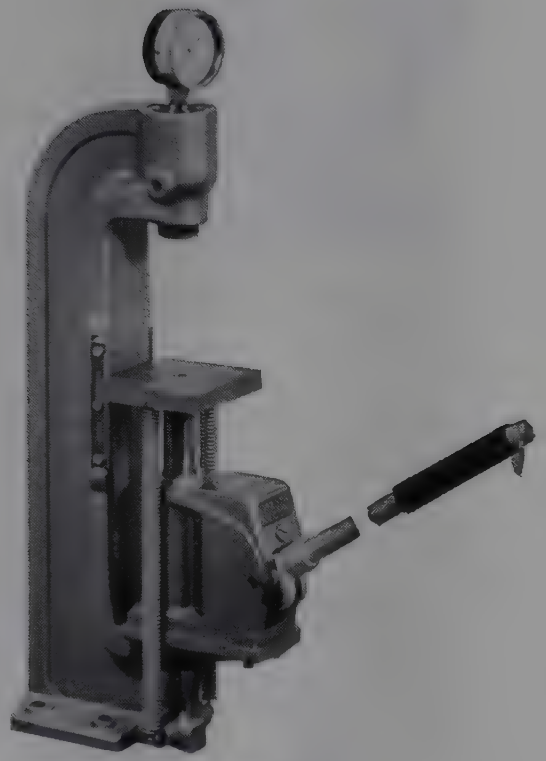
When used for expression of oil from ground material, hotplates PU-055 should be used. This method enables oil samples for analysis to be obtained more rapidly than by the extraction or percolation methods.

PU-090

TEST CYLINDER OUTFIT, 1⅛ in dia. (1 in^2), 3 in deep. Comprises steel cylinder, base pad, plunger and U-shape ejector, stainless steel pan for collecting liquid and ten filter pads of prepared felt for confining wet materials. All steel parts are plated to resist corrosion ... ... Each **£20·00** *f*

PU-095

TEST CYLINDER OUTFIT, as PU-090 but 2¼ in dia. (4 in^2) ... ... Each **£31·50** *f*



PU-110

HYDRAULIC PRESS

Total load 5 tons

PU-110

BENCH PRESS, hydraulic, maximum pressure 5 tons. A totally sealed jack built into an open gap press frame with a steel plate over the ram head to form the press platen. The platen is spring loaded to return to the lowest position when pressure is released and runs in guides which are calibrated in inches. The press head comprises a changeable tool holder and a load indicator is fitted. Operation is by a front hand lever which also releases the pressure when it is revolved. Bolting down holes are provided for fixing to a firm base. Overall height 63 cm including load indicator ... ... Each **£66·00** *m*

SODIUM WIRE PRESS

PU-180

PRESS, sodium wire, with hardened steel ram and mould 17 mm dia., complete with two moulds of 0·5 and 1·0 mm orifice diameter respectively. Overall dimensions 50 cm dia. × 50 cm high ... Each **£30·00** *bS*

REPLACEMENT PARTS

PU-183	**Steel mould,** with orifice 0·5 mm dia., to accept 17 mm ram... ... ... Each	**£3·70**	*bS*
PU-184	**Steel mould,** with orifice 1·0 mm dia., to accept 17 mm ram... ... ... Each	**£3·70**	*bS*

TABLET PRESS

PU-210

TABLET PRESS, for 2 mm and 5 mm dia. tablets, with hardened steel rams and dies. Overall dimensions 10 cm dia. × 20 cm high ... ... Each **£7·50** *cS*

PU-180

PU-210

Items on this page coded *S* normally available from stock.

PROJECTORS

SLIDE AND FILMSTRIP PROJECTOR

PV-430

SLIDE AND FILMSTRIP PROJECTOR, *Rank Aldis* **Tutor 2,** for 35 mm slides and strips. Fitted with 24V 250W quartz halogen lamp cooled by motor driven fan. Includes carrying handle and mains voltage output socket. Complete with 10 cm lens, indexing film winder and slide carrier. For 110 to 250V a.c. single phase supplies.
Each **£64·95** *f*

ACCESSORIES

PV-434	**Fitted carrying case**	Each	**£6·50**	*f*
PV-436	**Lamp, replacement**	Each	**£2·65**	*f*

PV-430

EPIVISOR EPIDIASCOPE

The *Epivisor* is suitable for visual aid work in education and industrial training. Fitted with a 1000W lamp and cooling fan, it projects film strips, slides, drawings, photographs, maps, charts and book pages, an area up to 5×5 in (12·5×12·5 cm) being projected. An important feature of the *Epivisor* is the facility for instantly removing the entire upper section in order to place it on large flat subjects such as maps or blueprints. The projector then slides smoothly across the surface on polished feet, projecting that portion of the subject which is beneath the viewing aperture.

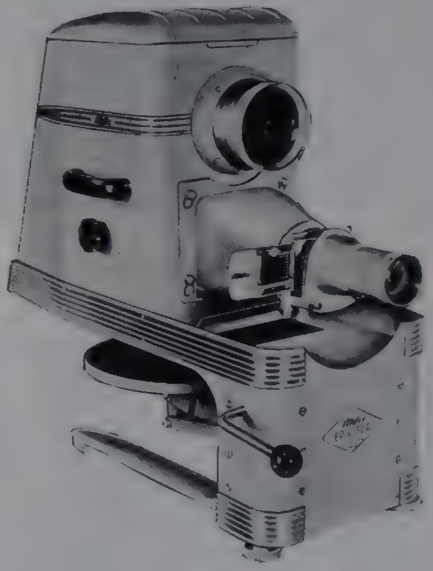
PV-492

EPIDIASCOPE, *Aldis Epivisor,* as specification, with 35 cm *f*4 lens for episcope projection and 10 cm *f*2·8 lens for 2×2 in slides, complete with lamp for 240V a.c. single phase supplies ... ... Each **£144·60** *f*

REPLACEMENT PART

PV-496	**Projection lamp, 1000W**	Each	**£3·10**	*m*

When ordering please state voltage and frequency of supply.



PV-492

OVERHEAD PROJECTOR

A versatile overhead projector in which the projection stage may be used horizontally, sloped at a desk-like angle of 15° or vertically (for chemistry experiments, etc.) and the projection angle may be varied between horizontal to an elevation of 35° by means of a smoothly operating lever. The 25·4 cm (10 in) square stage is fitted with a 15 m (50 ft) acetate roll wound to and fro by drive handles on either side of the main case. Fine focusing from 1·5 to 3·0 m (5 to 10 ft) is effected by means of a helical gear and magnification ranges from ×4 to ×8. Cleats on either side of the projector provide stowage of the 4·5 m (15 ft) three-core mains cable and an extension cable if required. The Fresnel lens and the mirror are easily accessible for cleaning. The 245V 650W tungsten halogen lamp is cooled by a turbo-fan; should the fan fail, a built-in thermal cut-out switches off the lamp.

PV-520

OVERHEAD PROJECTOR, *Rank Aldis,* as specification, including lamp and lens. Dimensions 55×38×56 cm. Weight 12·7 kg. For 240V a.c. single phase supplies.
Each **£98·00** *m*

ACCESSORY

PV-522	**Transparency materials kit,** comprising transparent and coloured sheet and mounts, pencils, pens and duster.	Kit	**£5·40**	*m*

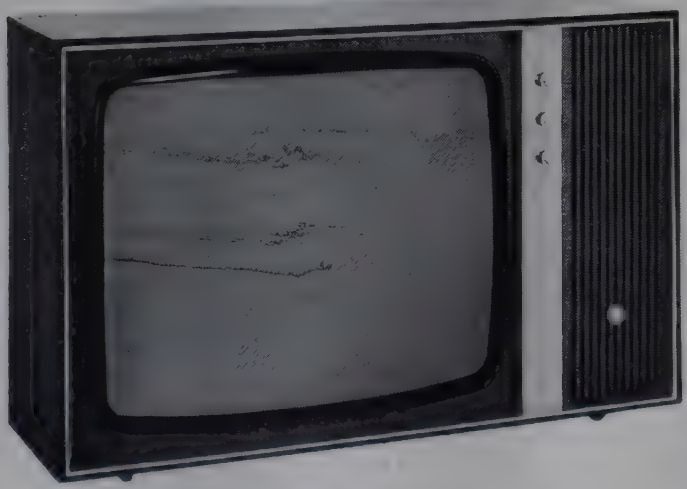
PV-520

CLOSED-CIRCUIT TELEVISION

A complete outfit for

- **Demonstrating small items and hazardous experiments**
  - **Projection microscopy**
    - **Observation of industrial processes**

Camera in use with melting point apparatus



Monitor

A high definition assembly of camera and 20 in monitor supplied complete with cable and connectors. Controls are as simple to operate as a domestic television receiver, and the use of printed circuits throughout leads to reliability in service.

Camera and monitor can be up to 2000 ft (600 metres) apart, enabling remote observation of industrial processes, and complete safety of operators. More advanced equipment is also available, including cameras controllable from the monitor position, weatherproof housings etc. Further information can be supplied against details of the application.

CAMERA

The camera is fully transistorised with automatic sensitivity control and operates on 625 lines at 50 fields/sec. The spectral response is similar to panchromatic film and good quality pictures are obtained with illumination levels of 8 ft lamberts. It can be operated in ambient temperatures up to 40°C without deterioration of performance.

A 2·5 cm *f*1·9 lens is supplied, giving an angle of view of 28°, but the standard 'C' type mounting enables other 16 mm cine lenses to be used. Fixing holes, tapped $\frac{1}{4}$ in Whitworth, are provided in the base for mounting purposes.

Dimensions without lens are 9 × 15·5 × 31·5 cm long, weight 4 kg.

The camera requires a mains electricity supply.

MONITOR

The monitor is housed in a wooden case with ON/OFF, brightness and contrast controls. Facilities are provided for operating several monitors in series from one camera if required. Each monitor requires a mains electricity supply.

Cabinet dimensions 66 × 42 × 33 cm. Weight 30 kg.

Picture size 39 × 30 cm.

SERVICE

In the U.K. the outfit is delivered, set up and demonstrated by engineers from a *Pye* service depot, who ensure the equipment is working satisfactorily. Maintenance contracts may be arranged, but this is not essential, and spares and repairs are promptly available from the service depot.

Details of export service arrangements on application.

PV-600

TELEVISION OUTFIT, *Pye*, as specification including one camera, one monitor, plugs and 25 ft (7·5 metres) coaxial cable. For operation on 200/240V 50 Hz supplies.
Each **£312·00** *f*

Price includes delivery, setting up and one month's servicing in U.K. only. Export price on application.

ACCESSORIES

PV-630 **Monitor,** additional. For 220/240V 50 Hz supplies.
Each £113·00 *f*

PV-640 **Tripod,** with pan and tilt head and adjustable legs, for mounting camera ... ... Each £23·00 *f*

PV-650 **Lens,** 5 cm, *f*1·9, giving angle of view 14°.
Each £37·10 *f*

PUMPS

Aquarium aerators	see	**AIR PUMPS**
Pumps, air	see	**AIR PUMPS**
Pump, carboy	see	**CARBOYS**
Pumps, chemical	see	**WATER PUMPS**
Pumps, filter	see	**FILTER PUMPS**
Pumps, peristaltic	see	**WATER PUMPS**
Pumps, vacuum	see	**VACUUM PUMPS**
Pumps, water	see	**WATER PUMPS**

PYROMETER INDICATORS

MAXIMUM TEMPERATURE 400°C

PX-020

PYROMETER, portable, with 7 cm dual scale calibrated **0–200 and 0–400°C.** Complete with thermometer for ambient temperature correction and pistol grip copper-constantan needle thermocouple. In wood carrying case.
Each **£40·00** *m*

ACCESSORY

PX-022 **Thermocouple, copper-constantan, surface contact,** approximately 25 cm long with plastics handle and 1·5 m of flexible compensating cable ... ... Each **£7·75** *m*

PX-020

PX-022

MAXIMUM TEMPERATURE 1200°C

PX-040

PYROMETER, flush mounting, 7 cm rectangular scale, range **0–1200°C. Requires but does not include a chromel-alumel thermocouple** ... Each **£8·50** *m*

ACCESSORY

EE-645 **Bench stand.** For details and price see entry in List No. sequence.

0
200
400
600
800
1000
1200
°C
Gallenkamp
PX-040

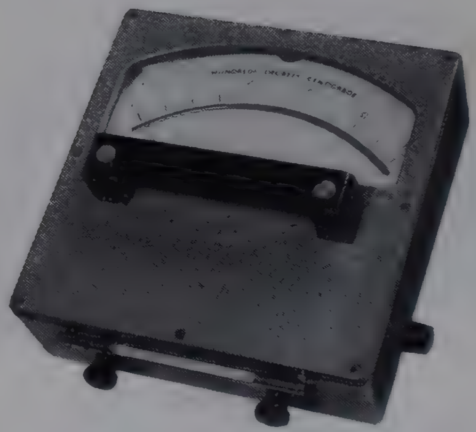
PX-045

PYROMETER, bracket mounting, 10 cm scale, range **0–1200°C.** With automatic cold junction compensation. **Requires but does not include a chromel-alumel thermocouple** ... ... Each **£23·50** *m*

For illustration see page 616.

PX-050

PYROMETER, portable, 20 cm scale, range **0–1200°C.** With manual cold junction compensation. **Requires but does not include a chromel-alumel thermocouple.**
Each **£36·00** *m*


PX-050
PX-095

ACCESSORIES FOR PX-040, PX-045 and PX-050

PX-052 **Thermocouple, chromel-alumel, furnace mounting pattern,** for 23 cm immersion. With mounting flange, 10 mm outside diameter porcelain sheath and 185 cm of flexible compensating cable with spade ends.
Each **£4·20** *m*

PX-054 **Thermocouple, chromel-alumel, blade pattern,** with 46 cm handle and 185 cm of flexible compensating cable with spade ends ... ... Each **£7·50** *m*

PX-055 **Thermocouple, chromel-alumel, needle pattern,** with pistol grip and 185 cm of flexible compensating cable with spade ends ... ... Each **£9·75** *m*

PX-057 **Rotary switch, 3-way,** wall mounting, double pole with self cleaning contacts, mounted in dustproof case.
Each **£13·00** *m*

PX-059 **Compensating cable,** flexible, for chromel-alumel thermocouples. Colour coded to BS 1843.
Metre **£0·65** *c*

PX-054

PX-055

All items on this page normally available from stock.

PYROMETER INDICATORS

500
1000
1500
°C
Gallenkamp

PX-075

MAXIMUM TEMPERATURE 1600°C

PX-075

PYROMETER, flush mounting, 7 cm rectangular scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple.** Each **£9·00** *m*

ACCESSORY

EE-645 **Bench stand.** For details and price see entry in List No. sequence.

PX-085

PYROMETER, bracket mounting, 10 cm scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple.** Each **£22·00** *m*

PX-095

PYROMETER, portable, 20 cm scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple** ... Each **£37·00** *m*

For illustration see page 615.

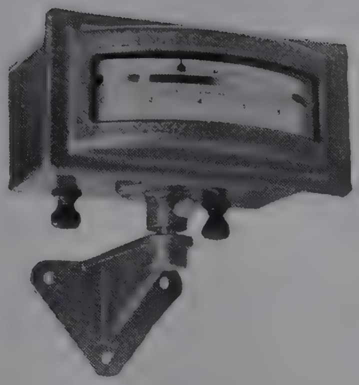
ACCESSORIES FOR PX-075, PX-085 and PX-095

PX-096 **Thermocouple, platinum–13% rhodium platinum, furnace mounting pattern,** for 23 cm immersion. With mounting flange, aluminous porcelain sheath 10 mm outside diameter and 185 cm of flexible compensating cable with spade ends ... ... Each **£20·25** *m*

PX-097 **Thermocouple, platinum–13% rhodium platinum, portable pattern,** 30 cm long, with aluminous porcelain sheath 10 mm outside diameter, ebonite handle and 185 cm of flexible compensating cable with spade ends. Each **£20·50** *m*

PX-099 **Compensating cable,** flexible, for platinum–13% rhodium platinum thermocouples. Colour coded to BS 1843 ... ... Metre **£0·30** *c*

PX-057 **Rotary switch,** 3-way. For details and price see entry in List No. sequence.



PX-045
PX-085

PYROMETER CONTROLLERS

PX-170

For indicating and controlling the temperature of laboratory furnaces. Require thermocouple sensing elements which may be either chromel-alumel for operation up to 1200°C, or platinum-rhodium platinum for operation up to 1600°C. A fail safe thermocouple break circuit is built-in.

The controllers have 18 cm anti-parallax scales with robust spring-mounted jewel bearing galvanometers for temperature indication and adjustable pointers for setting the control point. Scale accuracy is ± 1%, control accuracy within 0·2%. The load switching relay is suitable for non-inductive loads up to 5A at 250V a.c. and the switch mode is indicated by red and green lamps. For 230/250V 50 Hz single phase supplies.

PX-170

PYROMETER ON/OFF CONTROLLER, 0–1200°C, as specification, **bracket mounting.** Requires but does not include a chromel-alumel thermocouple. Each **£72·00** *m*

ACCESSORIES

PX-052 **Thermocouple, chromel-alumel** ... ...
PX-059 **Compensating cable** ...
} For details and prices see entries in List No. sequence.

PX-175

PYROMETER ON/OFF CONTROLLER, 0–1600°C, as specification, **bracket mounting.** Requires but does not include a platinum-13% rhodium platinum thermocouple ... ... Each **£72·00** *m*

ACCESSORIES

PX-096 **Thermocouple, platinum–13% rhodium platinum** ...
PX-099 **Compensating cable** ...
} For details and prices see entries in List No. sequence.

TEMPERATURE CONTROL WITH HIGH POWER LOADS

PX-170 and PX-175 may be used in conjunction with the *Gallenkamp* **ELECTRONIC RELAY, EC-780** to switch up to 20A in each of two independent 240V a.c. non inductive circuits. For full details of EC-780 see entry in List No. sequence.

All items on this page normally available from stock.

PX-360

COLD JUNCTION, AUTOMATIC, electrically heated, to operate at a constant fixed temperature in the range 42 to 48°C with a temperature fluctuation less than 0·2degC. Its use eliminates the inconvenience and trouble associated with maintaining a melting ice bath. The cylindrical aluminium body has a 19 mm hole drilled through its centre to accommodate thermocouple cold junctions. The body is wound with a heating element and accurate temperature control is obtained with a proportioning thermostat. The body is enclosed in a plastics cylinder to provide electrical and thermal insulation and the assembly is dustproof. Overall dimensions 7·5 cm diameter × 21 cm long. For 200/250V a.c. or d.c. supplies. Each **£11·55** *fS*

PX-360

THERMOCOUPLE TEST SET

Suitable for:

(a) Checking and calibration of thermocouples by comparison with a standard thermocouple.
(b) Measurement of thermocouple, lead resistance etc. (the reversing switch enables correction to be made for any inherent e.m.f. in the circuit and avoids the need for reversing leads.
(c) Calibration of indicators, recorders and controllers under correct conditions of external circuit resistance.

SPECIFICATION

Potentiometer ranges	0–20 mV and 1–100 mV
Potentiometer accuracy	about ±0·1%
Bridge accuracy	about ±0·1%
Potential source ranges	20 mV, 50 mV and 100 mV

PX-375

THERMOCOUPLE TEST SET, *Pye*, as specification, comprises d.c. potentiometer, Wheatstone bridge, potential source with variable resistance load, taut suspension pointer galvanometer, two 1·5V batteries and instructions manual in carrying case. Each **£113·00** *f*

PX-375

DISAPPEARING FILAMENT PYROMETER

A simple, practical and convenient optical pyrometer, suitable for laboratory and industrial use. The instrument is light in weight and portable and the complete outfit, including the nickel-iron accumulator, can be contained in a carrying case, available as an accessory. The pyrometer comprises essentially an electric lamp in circuit with a small ammeter and rheostat. By adjusting the rheostat, the current passing through the lamp can be varied and the brightness of the lamp filament adjusted to match that of the hot body whose temperature is to be measured. The lamp is contained within a short telescope, on which the ammeter is mounted with its scale facing the observer. The matching of the filament is simply and accurately obtained by viewing it against a background formed by the hot body and adjusting the rheostat until the tip of the filament cannot be distinguished from the background. The reading of the ammeter scale, which is calibrated in degC, then indicates the temperature.

PX-390

PYROMETER, DISAPPEARING FILAMENT, *Cambridge*, range 700 to 1400°C or 900 to 1600°C, **without carrying case** ... ... Each **£61·75** *f*

When ordering please state range required.

PX-392

PYROMETER, as PX-390, but for double range 700 to 1300°C and 1000 to 1800°C, **without carrying case.** Each **£68·65** *f*

ACCESSORY

PX-394 **Carrying case** ... ... Each **£9·90** *fS*

PX-390

Items on this page coded *S* **normally available from stock.**

QUICKFIT AND *CLEARFIT* STANDARD JOINT APPARATUS

A summary of the contents of the section, which has a broadly alphabetical arrangement will be found below. A guide to other *Quickfit* apparatus included in this catalogue appears at the foot of this page.

Further useful information relating to the care and maintenance of *Quickfit*, *Clearfit* and (AG) standard joint apparatus will be found under page heading STANDARD JOINT GLASSWARE.

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OTHER *Quickfit* AND *Clearfit* APPARATUS APPEARS IN THIS CATALOGUE UNDER THE FOLLOWING PAGE HEADINGS

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Demonstration Set

DISTILLATION
Water still

DISTILLATION AND PREPARATION
Quickfit and *Clearfit* sets

GAS GENERATORS

JOINTS
Cone and socket, flat flange and ball and cup joints

PIPETTES
Automatic dispensers

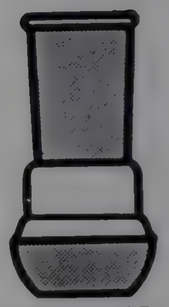
STOPCOCKS
Vacuum stopcocks

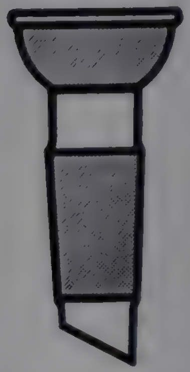
ADAPTERS

CONICAL-SPHERICAL ADAPTERS

These adapters used as a pair at a critical point provide a ready means of introducing flexibility into a conical jointed assembly.

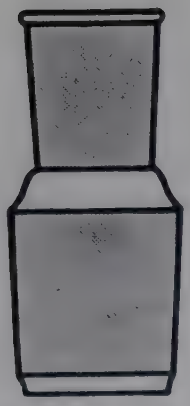
List No.	Socket	Cone	Ball/Cup	Clip Ref. JR-260	Ten	Each
Quickfit					£	£
Q-SB 2/29	19/26	—	S 29	JC 29	10·10	1·12
Q-SB 3/35	24/29	—	S 35	JC 35	11·70	1·40
Q-CC 2/29	—	19/26	S 29	JC 29	10·70	1·18
Q-CC 3/35	—	24/29	S 35	JC 35	10·90	1·20

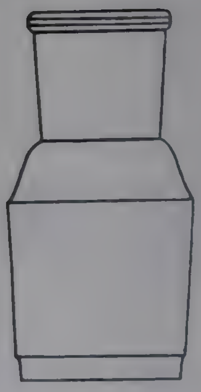

Q-SB 3/35


Q-CC 3/35

REDUCTION ADAPTERS

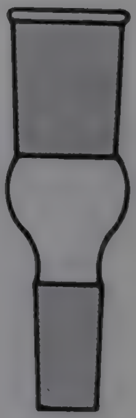
List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-DA 01	10/19	14/23	5·30	0·59
Q-DA 12	14/23	19/26	4·80	0·53
Q-DA 13	14/23	24/29	5·30	0·59
Q-DA 14	14/23	29/32	5·30	0·59
Q-DA 23	19/26	24/29	5·30	0·59
Q-DA 24	19/26	29/32	5·30	0·59
Q-DA 25	19/26	34/35	5·80	0·64
Q-DA 26	19/26	40/38	8·50	0·94
Q-DA 27	19/26	45/40	9·00	1·00
Q-DA 29	19/26	55/44	10·60	1·18
Q-DA 34	24/29	29/32	5·80	0·64
Q-DA 35	24/29	34/35	5·80	0·64
Q-DA 36	24/29	40/38	5·80	0·64
Q-DA 37	24/29	45/40	9·00	1·00
Q-DA 38	24/29	50/42	10·10	1·12
Q-DA 39	24/29	55/44	10·60	1·18
Q-DA 45	29/32	34/35	5·90	0·66
Q-DA 56	34/35	40/38	9·00	1·00
Q-DA 57	34/35	45/40	9·50	1·06
Q-DA 58	34/35	50/42	10·60	1·18
Q-DA 59	34/35	55/44	12·70	1·40
Clearfit				
Q-KDA 12	14/23	19/26	8·50	0·94
Q-KDA 13	14/23	24/29	9·00	1·00
Q-KDA 14	14/23	29/32	9·50	1·04
Q-KDA 23	19/26	24/29	9·50	1·04
Q-KDA 24	19/26	29/32	9·50	1·04
Q-KDA 34	24/29	29/32	10·10	1·12


Q-DA 24

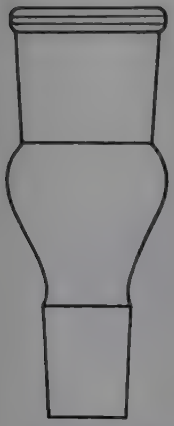

Q-KDA 24

All items on this page normally available from stock (code *m*).

ADAPTERS



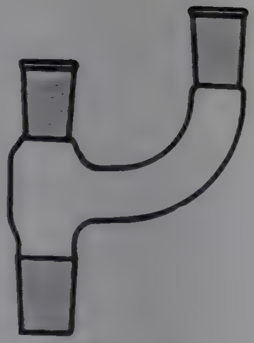
Q-XA 31



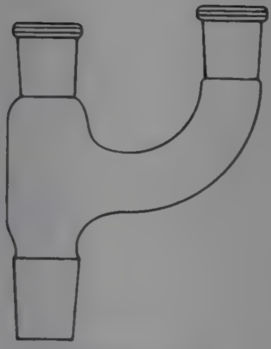
Q-KXA 42

EXPANSION ADAPTERS

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-XA 10	14/23	10/19	8·00	0·88
Q-XA 21	19/26	14/23	5·80	0·64
Q-XA 31	24/29	14/23	6·40	0·72
Q-XA 32	24/29	19/26	6·40	0·72
Q-XA 41	29/32	14/23	8·50	0·94
Q-XA 42	29/32	19/26	8·00	0·88
Q-XA 43	29/32	24/29	7·40	0·82
Q-XA 52	34/35	19/26	9·00	1·00
Q-XA 53	34/35	24/29	8·50	0·94
Q-XA 54	34/35	29/32	8·50	0·94
Clearfit				
Q-KXA 21	19/26	14/23	8·50	0·94
Q-KXA 31	24/29	14/23	9·00	1·00
Q-KXA 32	24/29	19/26	9·00	1·00
Q-KXA 41	29/32	14/23	10·60	1·18
Q-KXA 42	29/32	19/26	10·60	1·18
Q-KXA 43	29/32	24/29	10·60	1·18



Q-MA 1/3

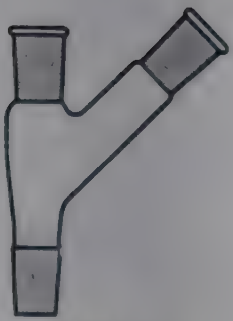


Q-KMA 1/3

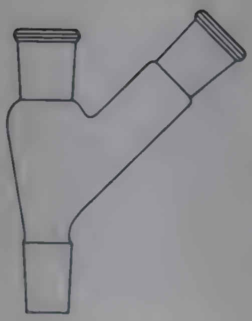
MULTIPLE ADAPTERS

With two necks parallel

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-MA 1/00	10/19	10/13	13·50	1·50
Q-MA 1/11	14/23	14/23	13·50	1·50
Q-MA 1/2	19/26	19/26	13·50	1·50
Q-MA 1/3	19/26	24/29	13·50	1·50
Q-MA 1/33	24/29	24/29	17·50	1·95
Q-MA 1/5	19/26	34/35	14·00	1·55
Clearfit				
Q-KMA 1/2	19/26	19/26	13·50	1·50
Q-KMA 1/3	19/26	24/29	13·50	1·50
Q-KMA 1/33	24/29	24/29	17·50	1·95
Q-KMA 1/44	29/32	29/32	19·50	2·15



Q-MA 2/2



Q-KMA 2/33

With two necks at 45°

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-MA 2/2	19/26	19/26	14·00	1·55
Q-MA 2/3	19/26	24/29	14·00	1·55
Clearfit				
Q-KMA 2/33	24/29	24/29	18·00	2·00

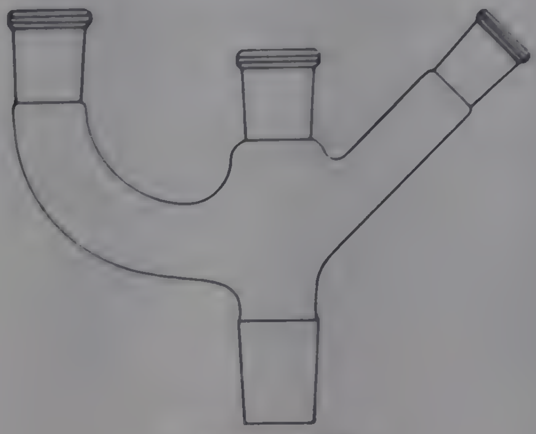
All items on this page normally available from stock (code *m*).

ADAPTERS

MULTIPLE ADAPTERS

With three necks, two parallel, one at 45°

List No.	Sockets		Cone	Ten	Each
	Parallel necks	Angled neck			
Quickfit				£	£
Q-MA 4/13	19/26	14/23	24/29	21·00	2·35
Q-MA 4/23	19/26	19/26	24/29	20·00	2·20
Q-MA 4/25	19/26	19/26	34/35	21·00	2·35
Clearfit					
Q-KMA 4/13	19/26	14/23	24/29	24·00	2·70
Q-KMA 4/23	19/26	19/26	24/29	23·50	2·60
Q-KMA 4/3	24/29	24/29	24/29	24·50	2·70
Q-KMA 4/1411	14/23	14/23	29/32	24·00	2·65

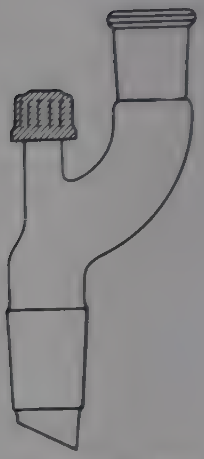


Q-KMA 4/23

Swan neck adapters

For use with thermometer or air leak tube

List No.	Socket	Cone	Thread	Ten	Each
Quickfit				£	£
Q-MA 6/11	14/23	14/23	13	13·00	1·45
Q-MA 6/22	19/26	19/26	13	13·00	1·45
Q-MA 6/23	19/26	24/29	13	13·00	1·45
Clearfit					
Q-KMA 6/33	24/29	24/29	13	15·50	1·75

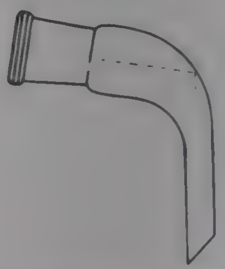


Q-KMA 6/33

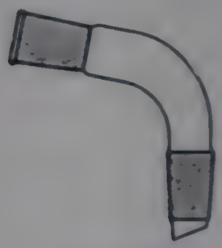
RECEIVER ADAPTERS

Plain bends, short

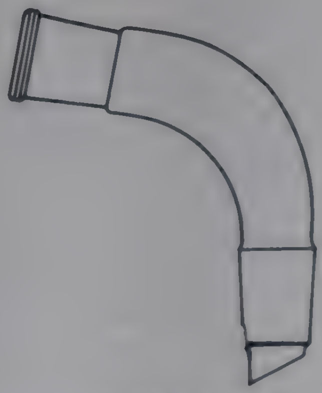
List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-RA 1/01	14/23	—	6·00	0·66
Q-RA 1/02	19/26	—	6·50	0·72
Q-RA 1/03	24/29	—	6·50	0·72
Q-RA 9/11	14/23	14/23	8·50	0·94
Q-RA 9/22	19/26	19/26	8·50	0·94
Q-RA 9/23	19/26	24/29	7·50	0·82
Q-RA 9/33	24/29	24/29	9·50	1·06
Q-RA 9/55	34/35	34/35	15·50	1·75
Clearfit				
Q-KRA 1/02	19/26	—	7·50	0·82
Q-KRA 1/03	24/29	—	7·50	0·82
Q-KRA 9/22	19/26	19/26	11·00	1·20
Q-KRA 9/33	24/29	24/29	12·50	1·40



Q-KRA 1/03



Q-RA 9/22



Q-KRA 9/33

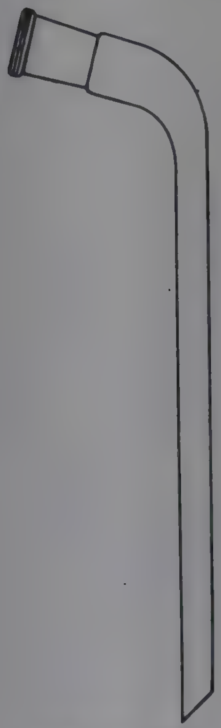
All items on this page normally available from stock (code *m*).

ADAPTERS

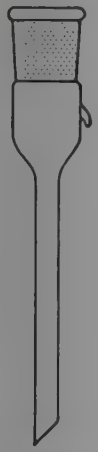
RECEIVER ADAPTERS

Plain bends, long

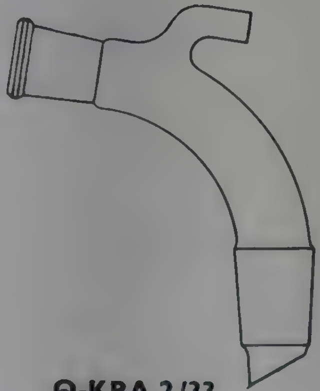
List No.	Socket	Ten	Each
Quickfit		£	£
Q-RA 1/10	10/19	6·50	0·72
Q-RA 1/11	14/23	7·00	0·78
Q-RA 1/12	19/26	7·00	0·78
Q-RA 1/13	24/29	7·50	0·82
Clearfit			
Q-KRA 1/11	14/23	8·00	0·88
Q-KRA 1/12	19/26	8·00	0·88
Q-KRA 1/13	24/29	8·50	0·94
Q-KRA 1/14	29/32	9·50	1·06



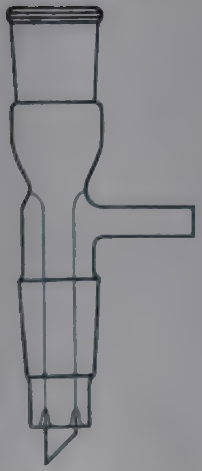
Q-KRA 1/12



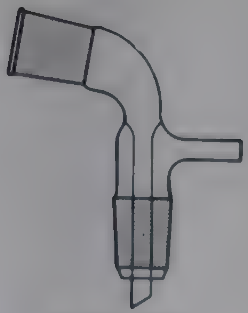
Q-RA 1/22



Q-KRA 2/33



Q-KRA 13/33



Q-RA 3/22

Straight delivery adapters

List No.	Socket	Ten	Each
Quickfit		£	£
Q-RA 1/21	14/23	6·00	0·66
Q-RA 1/22	19/26	6·00	0·66
Q-RA 1/23	24/29	6·00	0·66

Bends with vent

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-RA 2/00	10/19	10/13	9·00	1·00
Q-RA 2/11	14/23	14/23	9·00	1·00
Q-RA 2/22	19/26	19/26	10·00	1·10
Q-RA 2/23	19/26	24/29	9·00	1·00
Q-RA 2/33	24/29	24/29	10·00	1·10
Clearfit				
Q-KRA 2/11	14/23	14/23	10·50	1·16
Q-KRA 2/22	19/26	19/26	12·00	1·35
Q-KRA 2/33	24/29	24/29	13·50	1·50

Vacuum type, bent

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-RA 3/11	14/23	14/23	14·50	1·60
Q-RA 3/22	19/26	19/26	16·00	1·80
Q-RA 3/23	19/26	24/29	15·50	1·70
Q-RA 3/33	24/29	24/29	15·50	1·70
Clearfit				
Q-KRA 3/11	14/23	14/23	16·00	1·80
Q-KRA 3/22	19/26	19/26	17·00	1·90
Q-KRA 3/33	24/29	24/29	17·00	1·90
Q-KRA 3/44	29/32	29/32	19·00	2·10

Vacuum type, straight

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-RA 13/33	24/29	24/29	14·00	1·55
Clearfit				
Q-KRA 13/33	24/29	24/29	15·50	1·70

All items on this page normally available from stock (code *m*).

ADAPTERS

RECEIVER ADAPTERS

Bends with socket connection

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-RA 4/11	14/23	14/23	12·50	1·40
Q-RA 4/22	19/26	19/26	13·00	1·45
Q-RA 4/23	19/26	24/29	13·50	1·50

Bends with multiple connections (pig)

List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-RA 5/00	10/19	10/13	20·00	2·20
Q-RA 5/11	14/23	14/23	30·50	3·40
Q-RA 5/21	19/26	14/23	31·00	3·50

Perkin intermediate receiver

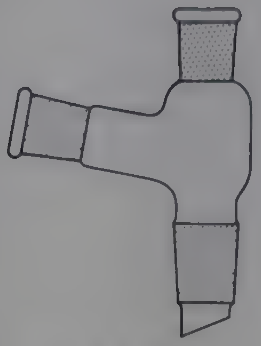
List No.	Socket	Cone	Five	Each
Clearfit/Rotaflo			£	£
Q-KTA 6/11	14/23	14/23	58·25	12·60

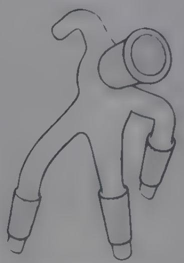
Adapters, socket to cone, with T-connection

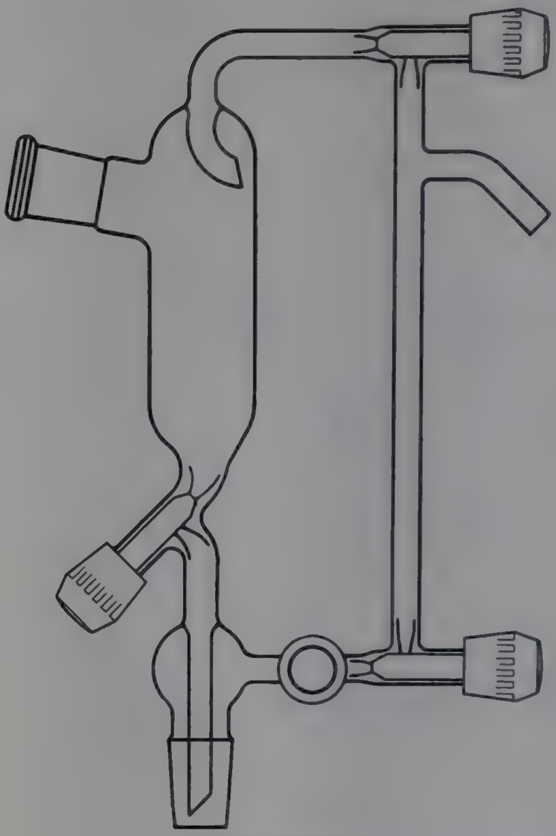
List No.	Socket	Cone	Ten	Each
Quickfit			£	£
Q-MF 17/1	14/23	14/23	8·00	0·88
Q-MF 17/2	14/3	19/26	8·00	0·88
Q-MF 17/3	14/23	24/29	8·50	0·94
Q-MF 18/2	19/26	19/26	10·00	1·10
Q-MF 18/3	19/26	24/29	8·00	0·88
Q-MF 18/5	19/26	34/35	9·50	1·04
Q-MF 18/33	24/29	24/29	10·00	1·10
Clearfit				
Q-KMF 17/1	14/23	14/23	10·50	1·16
Q-KMF 18/2	19/26	19/26	11·50	1·30
Q-KMF 18/33	24/29	24/29	12·50	1·40

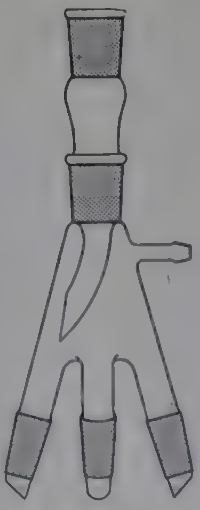
Vacuum type, with multiple connections

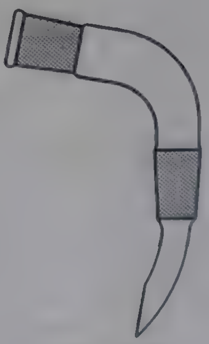
List No.	Description	Socket	Cone	Ten	Each
Quickfit				£	£
Q-RA 11	Vacuum receiver adapter, with 14/23 cones to take 4×100 ml receiver flasks	19/26	14/23	31·00	3·50
Q-RA 11/2	Adapter for vertical delivery	19/26	19/26	9·50	1·06
Q-RA 12/2	Adapter for sloping delivery	19/26	19/26	12·50	1·40

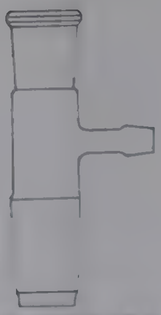

Q-RA 4/23


Q-RA 5/21


Q-KTA 6/11


Q-RA 11
Q-RA 11/2


Q-RA 12/2


Q-KMF 17/1
Q-KMF 18/2

All items on this page normally available from stock (code *m*).

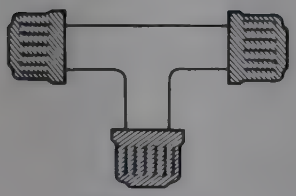
ADAPTERS

SCREW THREAD CONNECTORS

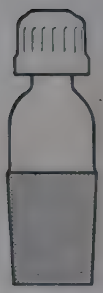
A range of connectors providing flexibility in assemblies where adjustable multiple connections are required. They are quick and easy to assemble and dismantle and when used in conjunction with standard glassware enable complicated assemblies to be constructed without the aid of a glassblower.

Connectors, T-shape

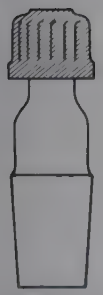
List No.	Thread	Approx. length of limbs	Ten	Each
Quickfit			£	£
Q-SQ 1/13	13	35 mm	12·20	1·35
Q-SQ 1/18	18	40 mm	15·40	1·70



Q-SQ 1/13



Q-ST 53/13



Q-KST 53/13

Cone and screw cap adapters

For fitting inlet tubes, thermometers, sampling tubes, stirrer glands or air leak tubes into standard joint sockets. The adapters have standard screw threads to BS 1918 into which a tube or thermometer 6–19 mm dia. can be fitted by means of a screw down cap, silicone rubber compression ring and ptfe washer.

List No.	Thread	Cone	Dia. through Screw Cap	Ten	Each
Quickfit				£	£
Q-ST 51/13	13	14/23	6 – 7 mm	8·00	0·88
Q-ST 52/13	13	19/26	6 – 7 mm	8·00	0·88
Q-ST 53/13	13	24/29	6 – 7 mm	8·50	0·94
Q-ST 54/13	13	29/32	6 – 7 mm	9·50	1·06
Q-ST 51/18	18	14/23	7 – 8·5 mm	8·50	0·94
Q-ST 52/18	18	19/26	7 – 8·5 mm	8·50	0·94
Q-ST 53/18	18	24/29	7 – 8·5 mm	8·50	0·94
Q-ST 54/18	18	29/32	7 – 8·5 mm	9·50	1·04
Q-ST 52/24	24	19/26	10·5–11·5 mm	10·00	1·10
Q-ST 53/24	24	24/29	10·5–11·5 mm	9·50	1·04
Q-ST 55/24	24	34/35	10·5–11·5 mm	12·00	1·35
Q-ST 55/28	28	34/35	18 –19 mm	11·50	1·30
Clearfit					
Q-KST 51/13	13	14/23	6 – 7 mm	8·00	0·88
Q-KST 52/13	13	19/26	6 – 7 mm	8·00	0·88
Q-KST 53/13	13	24/29	6 – 7 mm	8·50	0·94
Q-KST 54/13	13	29/32	6 – 7 mm	9·50	1·04
Q-KST 51/18	18	14/23	7 – 8·5 mm	8·50	0·94
Q-KST 52/18	18	19/26	7 – 8·5 mm	8·50	0·94
Q-KST 53/18	18	24/29	7 – 8·5 mm	8·50	0·94
Q-KST 54/18	18	29/32	7 – 8·5 mm	9·50	1·04
Q-KST 52/24	24	19/26	10 –11·5 mm	10·00	1·10
Q-KST 53/24	24	24/29	10 –11·5 mm	9·50	1·04
Q-KST 54/24	24	29/32	10 –11·5 mm	10·00	1·10

REPLACEMENT PARTS for Screw Thread Connectors.

List No.	Thread	Pack of 10
		£
Plastics Cap		
Q-QC 13/7	13	1·00
Q-QC 18/11	18	1·00
Q-QC 24/12	24	1·50
Rubber Ring		
Q-QR 13/6	13	0·40
Q-QR 18/7	18	0·60
Q-QR 24/11	24	1·10
PTFE Washer		
Q-QW 13/6	13	0·40
Q-QW 18/7	18	0·50
Q-QW 24/11	24	0·70

AG ADAPTERS

Suitable for fitting thermometers or gas entry tubes into standard joint sockets allowing adjustment of immersion depth. Cones 14/23 and 19/26.

For full details and prices see TJ-325 in List No. sequence.

All items on this page normally available from stock (code *m*).

ADAPTERS

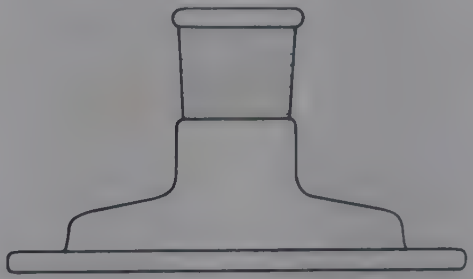
FLAT FLANGE ADAPTERS

The flange sizes given below represent the internal diameters in mm within the flanges.

The lid with 50 mm flat flange is for use with the 100 ml reaction vessels listed on page 644. It is particularly useful for the complete evaporation of solutions to leave a solid which can then easily be recovered quantitatively from this type of vessel. The 75 mm flat flange lids, when used with the 250 ml or 500 ml reaction vessels listed on page 644, facilitate operation with resinous materials in the 100 g range, and is generally useful for preparative chemical work.

All the 100 mm multi-socket/flat flange lids have a centre socket designed for use with a stirrer, a parallel side neck to take a thermometer or thermometer pocket and a side neck at an angle of 10° to the vertical to take a cylindrical dropping funnel up to 500 ml capacity. The remaining necks will accommodate condenser, stillhead, gas inlet, sampling tubes, stoppers, etc.

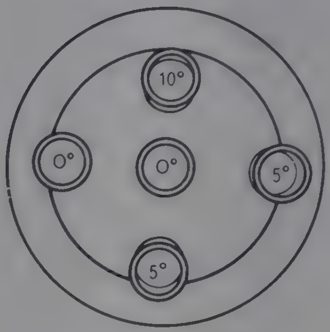
A multiple adapter such as QMA 2/2 can be fitted into the parallel side neck in order to provide offset clearance for a large dropping funnel.



Q-DA 5/100

Socket/flat flange

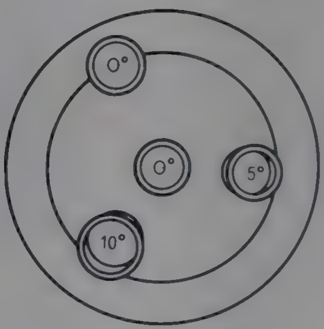
List No.	Flat flange	Socket	Ten	Each
Quickfit			£	£
Q-DA 5/75	75	34/35	29·00	3·20
Q-DA 5/100	100	34/35	29·00	3·20



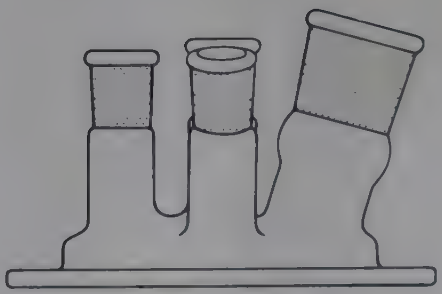
Q-MAF 2/2

Multi socket/flat flange

List No.	Flat flange	Centre neck	Side necks	Ten	Each
Quickfit				£	£
Q-MAF 0/50	50	10/19	4×10/19	47·50	5·30
Q-MAF 1/75	75	19/26	3×19/26 1×14/23	49·00	5·50
Q-MAF 2/2	100	19/26	4×19/26	49·00	5·50
Q-MAF 2/32	100	19/26	2×19/26 1×24/29	43·50	4·80
Q-MAF 2/52	100	19/26	3×19/26 1×34/35	53·00	5·90
Q-MAF 3/52	100	24/29	3×19/26 1×34/35	55·50	6·20
Q-MAF 5/2	100	34/35	3×19/26	54·00	6·00



Q-MAF 2/32

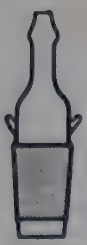


Q-MAF 2/52

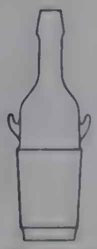
TUBING ADAPTERS

Cone to rubber tubing, straight connection

List No.	Cone	Ten	Each
Quickfit		£	£
Q-MF 10/1	14/23	6·00	0·66
Q-MF 10/2	19/26	6·50	0·72
Q-MF 10/3	24/29	7·50	0·84
Clearfit			
Q-KMF 10/1	14/23	6·50	0·72
Q-KMF 10/2	19/26	7·50	0·84
Q-KMF 10/3	24/29	8·50	0·94



Q-MF 10/2



Q-KMF 10/2

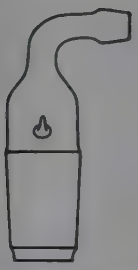
All items on this page normally available from stock (code *m*).

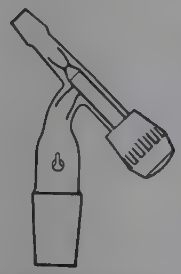
ADAPTERS

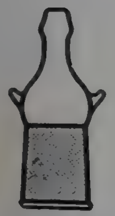
TUBING ADAPTERS

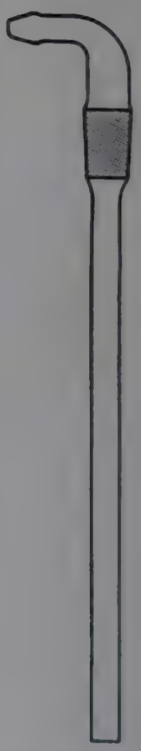
Cone to rubber tubing, right angle connection

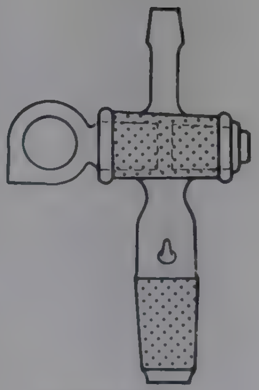
List No.	Cone	Ten	Each
Quickfit		£	£
Q-MF 10/1B	14/23	6·50	0·72
Q-MF 10/2B	19/26	7·50	0·84
Q-MF 10/3B	24/29	8·00	0·88
Q-MF 10/4B	29/32	8·50	0·94
Q-MF 10/5B	34/35	9·00	1·00
Clearfit			
Q-KMF 10/2B	19/26	8·00	0·88
Q-KMF 10/3B	24/29	8·50	0·94
Q-KMF 10/4B	29/32	9·00	1·00

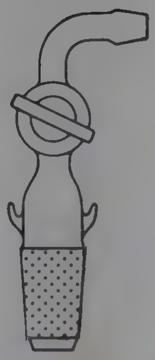

Q-KMF 10/3B

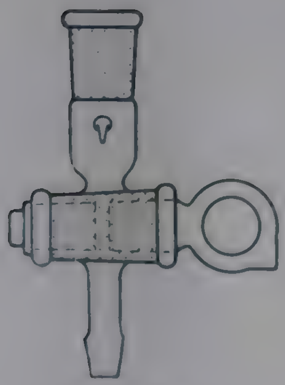

Q-KTA 11/3

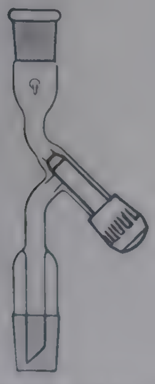

Q-MF 13/3

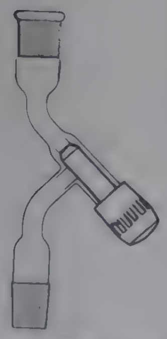

Q-MF 15/2B


Q-MF 11/3


Q-MF 11/3B


Q-MF 14/2


Q-CR 3T/23


Q-EF 6T/33

Cone to rubber tubing, straight connection

List No.	Cone	Ten	Each
Clearfit/Rotaflo		£	£
Q-KTA 11/1	14/23	27·00	3·00
Q-KTA 11/2	19/26	27·00	3·00
Q-KTA 11/3	24/29	27·00	3·00
Q-KTA 11/4	29/32	27·00	3·00

Cone with stem to rubber tubing, right angle connection

List No.	Socket	Ten	Each
Quickfit		£	£
Q-MF 15/1B	14/23	7·00	0·78
Q-MF 15/2B	19/26	8·00	0·88
Q-MF 15/3B	24/29	9·00	1·00

Socket to rubber tubing, straight connection

List No.	Cone	Ten	Each
Quickfit		£	£
Q-MF 13/2	19/26	7·50	0·82
Q-MF 13/3	24/29	7·50	0·82

STOPCOCK ADAPTERS

Cone to rubber tubing, with interchangeable stopcock, straight connection

List No.	Cone	Ten	Each
Quickfit		£	£
Q-MF 11/1	14/23	19·50	2·15
Q-MF 11/2	19/26	20·50	2·30
Q-MF 11/3	24/29	21·00	2·35

Cone to rubber tubing, with interchangeable stopcock, right angle connection

List No.	Cone	Ten	Each
Quickfit		£	£
Q-MF 11/1B	14/23	20·50	2·30
Q-MF 11/2B	19/26	21·00	2·35
Q-MF 11/3B	24/29	22·00	2·45
Q-MF 11/5B	34/35	23·50	2·60

Socket to rubber tubing, with interchangeable stopcock

List No.	Socket	Ten	Each
Quickfit		£	£
Q-MF 14/1	14/23	20·50	2·30
Q-MF 14/2	19/26	21·00	2·35
Q-MF 14/2B	19/26	22·00	2·45
Q-MF 14/3	24/29	22·00	2·45

Q-D 5/4 STOPCOCK KEYS, interchangeable.
Q-D 5/4R PLASTICS RETAINING RINGS. } For prices see page 643.

Vacuum stopcock

List No.	Socket	Cone	Ten	Each
Quickfit/Rotaflo			£	£
Q-CR 3T/23	19/26	24/29	47·50	5·30
Q-EF 6T/33	24/29	24/29	50·50	5·60
Q-EF 6T/55	34/35	34/35	57·00	6·40

All items on this page normally available from stock (code *m*).

CONDENSERS

AIR CONDENSERS

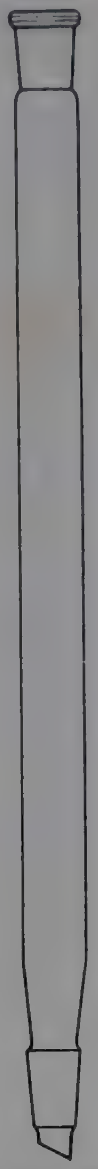
List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-C 2/00	100	10/19	10/13	6·50	0·72
Q-C 2/11	200	14/23	14/23	6·00	0·66
Q-C 2/12	150	19/26	19/26	7·00	0·78
Q-FC 7/23	300	24/29	24/29	8·50	0·94
Q-C 2/22	400	19/26	19/26	7·50	0·82
Q-FC 7/43	550	24/29	24/29	12·50	1·40
Q-FC 7/53	800	24/29	24/29	16·50	1·85
Clearfit					
Q-KC 2/11	200	14/23	14/23	9·00	1·00
Q-KC 2/12	150	19/26	19/26	10·00	1·10
Q-KC 2/22	400	19/26	19/26	10·50	1·16
Q-KCX 2/23	760	—	24/29	10·50	1·16

LIEBIG CONDENSERS

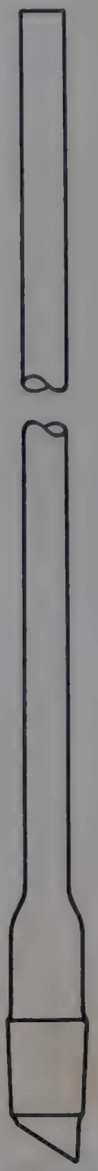
List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-C 1/00	60	10/19	10/13	11·50	1·30
Q-C 1/11	150	14/23	14/23	14·50	1·60
Q-C 1/12	200	19/26	19/26	15·00	1·65
Q-C 1/13	200	24/29	24/29	17·00	1·90
Q-CX 1/2/25	250	—	19/26	15·00	1·65
Q-C 1/22	400	19/26	19/26	16·50	1·85
Q-C 1/23	400	24/29	24/29	18·00	2·00
Q-C 1/55	500	34/35	34/35	67·50	7·40
Clearfit					
Q-KC 1/11	150	14/23	14/23	16·50	1·85
Q-KC 1/12	200	19/26	19/26	17·00	1·90
Q-KC 1/13	200	24/29	24/29	19·00	2·10
Q-KC 1/22	400	19/26	19/26	18·50	2·05
Q-KC 1/23	400	24/29	24/29	20·00	2·20
Q-KC 1/44/30	300	29/32	29/32	32·00	3·60

DAVIES CONDENSERS

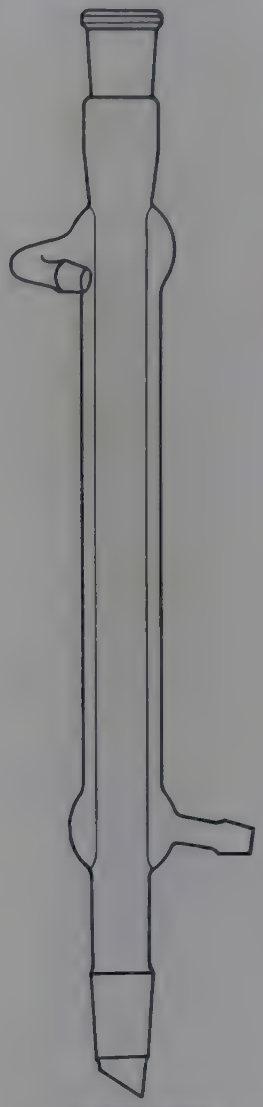
List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-C 5/00	100	10/19	10/13	31·50	3·50
Q-C 5/12	150	19/26	19/26	27·50	3·10
Q-C 5/13	150	24/29	24/29	29·50	3·30
Q-C 5/22	200	19/26	19/26	28·00	3·10
Q-C 5/23	200	24/29	24/29	30·00	3·30
Q-CX 5/23	200	—	24/29	29·00	3·20
Q-CX 5/25	200	—	34/35	33·50	3·70
Clearfit					
Q-KC 5/12	150	19/26	19/26	30·00	3·30
Q-KC 5/13	160	24/29	24/29	31·50	3·50
Q-KC 5/22	200	19/26	19/26	31·00	3·40
Q-KC 5/23	200	24/29	24/29	32·50	3·60
Q-KC 5/24	200	29/32	29/32	34·50	3·80



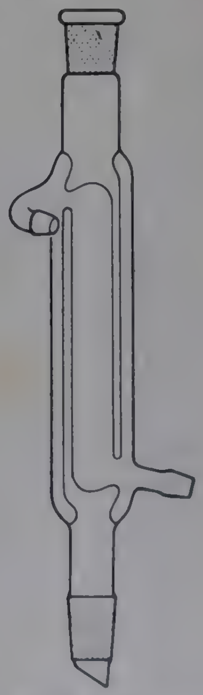
Q-KC 2/22



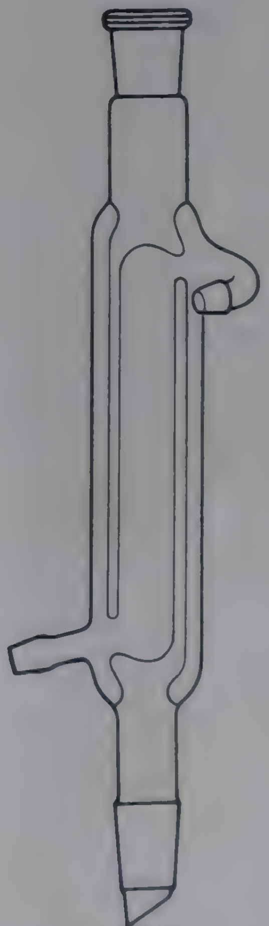
Q-KCX 2/23



Q-KC 1/12



Q-C 5/12

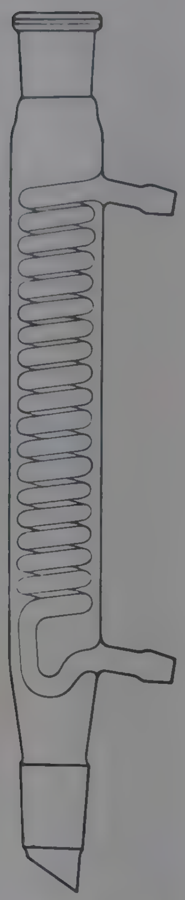


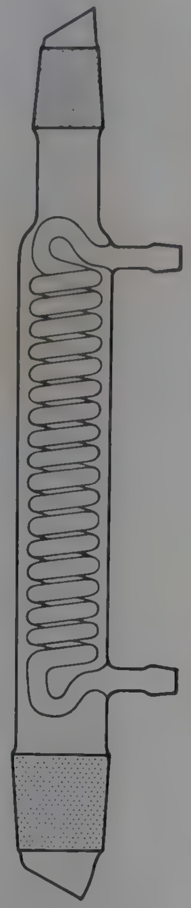
Q-KC 5/23

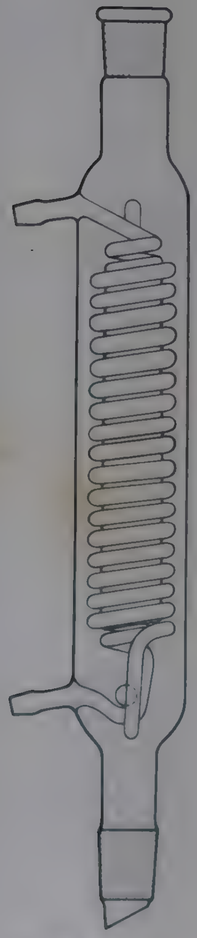
Davies condensers with standard joints see CONDENSERS.

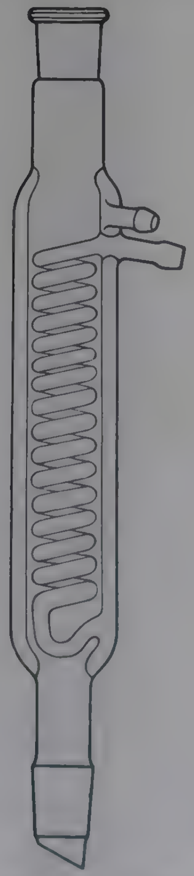
All items on this page normally available from stock (code *m*).

CONDENSERS


Q-KC 3/13


Q-CX 3/23


Q-C 4/12


Q-KCX 6/33

COIL OR GRAHAM CONDENSERS

List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-C 3/12	150	19/26	19/26	23·50	2·60
Q-C 3/13	150	24/29	24/29	24·00	2·65
Q-CX 3/04	150	—	29/32	23·00	2·55
Q-CX 3/05	150	—	34/35	24·00	2·65
Q-CX 3/06	200	—	40/38	31·50	3·50
Q-CX 3/07	200	—	45/40	36·00	4·00
Q-CX 3/08	200	—	50/42	36·00	4·00
Q-C 3/22	300	19/26	19/26	39·00	4·30
Q-C 3/23	300	24/29	24/29	40·00	4·40
Clearfit					
Q-KC 3/12	150	19/26	19/26	25·50	2·85
Q-KC 3/13	150	24/29	24/29	26·00	2·90
Q-KC 3/14	150	29/32	29/32	26·00	2·90
Q-KC 3/23	320	24/29	24/29	41·00	4·60

REVERSIBLE COIL CONDENSERS

List No.	Effective length mm	Cones	Ten	Each
Quickfit			£	£
Q-CX 3/23	150	19/26 and 24/29	25·50	2·85
Q-CX 3/35	150	24/29 and 34/35	27·50	3·10

DOUBLE COIL CONDENSERS

List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-C 4/12	200	19/26	19/26	67·00	7·40
Q-C 4/13	200	24/29	24/29	67·50	7·40
Q-C 13/55/2	380	34/35	34/35	—	14·80

JACKETED COIL CONDENSERS

List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-CX 6/22	150	19/26	19/26	57·50	6·40
Q-CX 6/33	150	24/29	24/29	56·50	6·20
Q-CX 6/05	150	—	34/35	56·50	6·20
Clearfit					
Q-KCX 6/33	155	24/29	24/29	58·50	6·60

All items on this page normally available from stock (code *m*).

CONDENSERS

INLAND REVENUE CONDENSERS

List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-C 6/12	200	19/26	19/26	57·50	6·40
Q-C 6/13	200	24/29	24/29	59·50	6·60

ALLIHN CONDENSERS

List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-CX 7/02	200	—	19/26	25·00	2·80
Q-CX 7/03	200	—	24/29	26·50	2·95
Q-CX 7/04	200	—	29/32	27·50	3·10
Q-CX 7/05	200	—	34/35	26·50	2·95
Q-CX 7/06	200	—	40/38	30·00	3·40
Q-CX 7/08	220	—	50/42	32·00	3·60
Clearfit					
Q-KCX 7/33	300	24/29	24/29	35·50	3·90

FRIEDRICHS CONDENSER

List No.	Effective length mm	Socket	Cone	Ten	Each
Quickfit				£	£
Q-C10/22	100	19/16	19/16	41·00	4·50

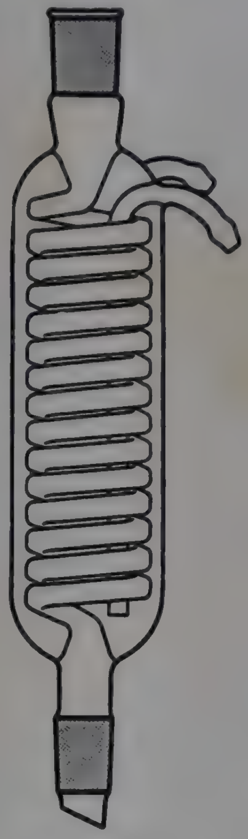
ETHER CONDENSER

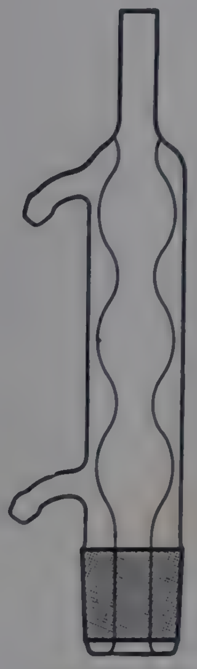
List No.	Effective length mm	Socket	Cone	Five	Each
Clearfit				£	£
Q-KC 11/33	180	24/29	24/29	55·75	12·00

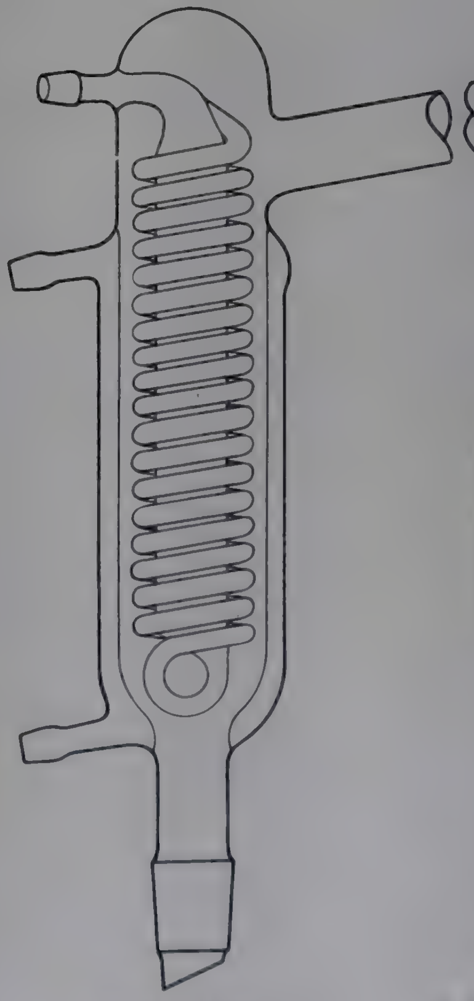
COLD FINGER CONDENSER

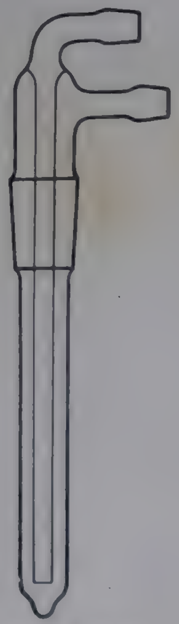
List No.	Effective length mm	Finger diameter mm	Cone	Ten	Each
Quickfit				£	£
Q-FC 14/00	100	12	19/26	14·00	1·55
Clearfit					
Q-KFC 14/00	100	12	19/26	15·50	1·75

Standard joint condensers see CONDENSERS.


Q-C 6/13

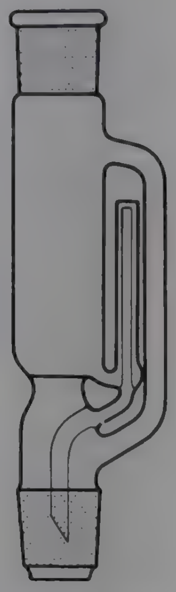

Q-CX 7/06


Q-KC 11/33


Q-KFC 14/00

All items on this page normally available from stock (code *m*).

EXTRACTORS



Q-EX 5/55

SOXHLET EXTRACTORS, to BS 2071.

List No.	Nominal capacity	Socket or Flange	Cone	Ten	Each
Quickfit				£	£
Q-EX 5/21	6 ml	19/26	14/23	23·50	2·60
Q-EX 5/32	20 ,,	24/29	19/26	25·00	2·80
Q-EX 5/43	40 ,,	29/32	24/29	26·50	2·95
Q-EX 5/53	60 ,,	34/25	24/29	29·00	3·20
Q-EX 5/55	60 ,,	34/35	34/35	30·00	3·30
Q-EX 5/55/100	100 ,,	34/35	34/35	31·50	3·50
Q-EX 5/63	100 ,,	40/38	24/29	30·50	3·40
Q-EX 5/55/200	200 ,,	34/35	34/35	36·50	4·10
Q-EX 5/83	200 ,,	50/42	24/29	37·50	4·20
Q-EX 5/75 *	600 ,,	75 mm	34/35	—	11·10
Q-EX 5/105 *	2 litre	100 mm	34/35	—	17·05

* Extractors Q-EX 5/75 and Q-EX 5/105 are designed to accommodate large samples up to 75 mm and 100 mm diameter (e.g. wool). They utilise 75 mm and 100 mm flat flange joints together with 34/35 socket adapters, as below. Stainless steel clips are available for the flat flanges.

List No.	Description	Socket	Flange	
Quickfit				
Q-DA 5/75	Adapter to fit Q-EX 5/75	34/35	75 mm	For prices see entries on page 625
Q-DA 5/100	Adapter to fit Q-EX 5/105	34/35	100 mm	
JR-260	Clip JC 75F to fit Q-EX 5/75	For prices see entries in List No. sequence		
JR-260	Clip JC 100F to fit Q-EX 5/105			

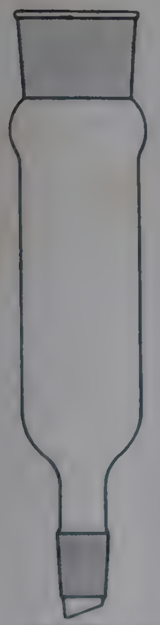
Gallenkamp **SOXHLET WATER BATHS**
see EV-100

SOXHLET EXTRACTORS
see EV-280 and EV-285

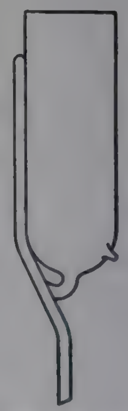
For details and prices see entries in List No. sequence.

JACKETED SOXHLET EXTRACTORS, for use with siphon liner or as plain tube with spiral support.

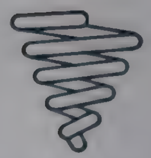
List No.	Description	Nominal capacity ml	Socket	Cone	Ten	Each
Quickfit					£	£
Q-EX 7/10	Liner	20	—	—	11·50	1·30
Q-EX 7/13	Body	—	34/35	24/29	11·50	1·30
Q-EX 7/15	Body	—	34/35	34/35	12·50	1·40
Q-EX 7/20	Liner	50	—	—	12·50	1·40
Q-EX 7/23	Body	—	45/40	24/29	17·00	1·90
Q-EX 7/30	Liner	100	—	—	13·50	1·50
Q-EX 7/33	Body	—	55/44	24/29	20·50	2·25



Q-EX 7/33



Q-EX 7/30



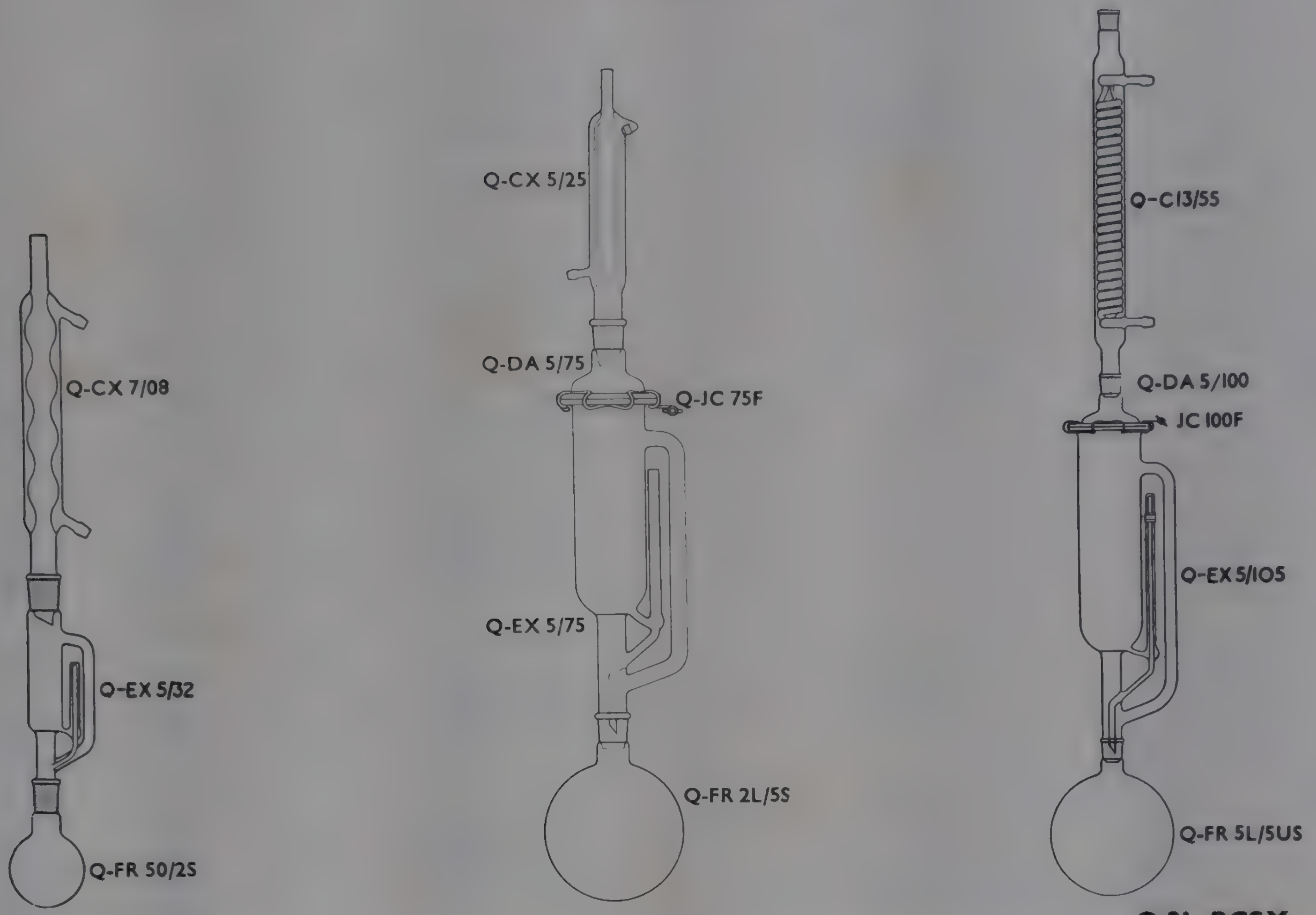
Q-EX 13/23

SPIRAL SUPPORTS, for use in extractor tubes and fractionating columns.

List No.	Diameter mm	To fit	Ten	Each
Quickfit			£	£
Q-EX 13/12	16	Q-FC 1	1·60	0·23
Q-EX 13/23	21	Q-FC 7	1·60	0·23
Q-EX 13/25	29	Q-FC 6 and 8	2·20	0·28
Q-EX 13/26	35	Q-EX 7/13 and 7/15 Q-EX 7/23 and 7/33	2·20	0·28

All items on this page normally available from stock (code *m*).

EXTRACTORS


Q-CX 7/08
Q-EX 5/32
Q-FR 50/2S
Q-CX 5/25
Q-DA 5/75
Q-JC 75F
Q-EX 5/75
Q-FR 2L/5S
Q-C13/55
Q-DA 5/100
JC 100F
Q-EX 5/105
Q-FR 5L/5US

Q-25 RASX **Q-600 RDSX** **Q-2L RCSX**

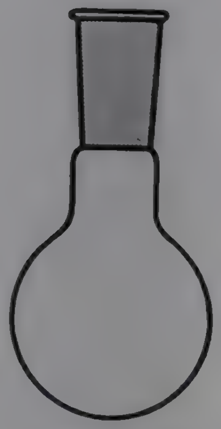
Specimen assemblies of extraction apparatus

SOXHLET LIQUID/SOLID EXTRACTION ASSEMBLIES

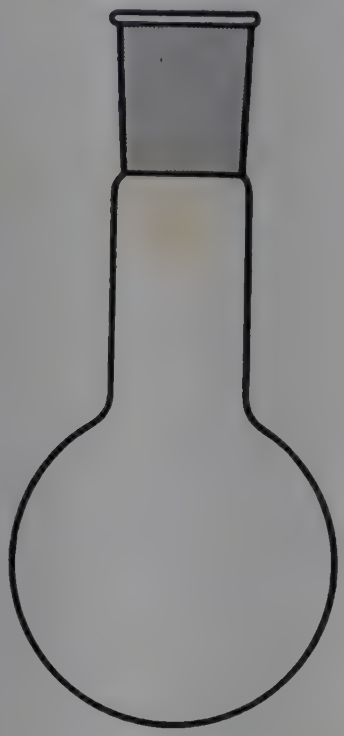
Assembly List No.	COMPONENTS							Suitable thimble size mm	Ten	Each
	EXTRACTOR BODY		FLASK		CONDENSER		ADAPTER			
	Capacity ml	List No.	Capacity ml	List No.	Type	List No.	List No.			
Quickfit									£	£
Q-4 PDSX	6	Q-EX 5/21	50	Q-FP 50/1	Davies	Q-C 5/12	—	10× 50	57·00	6·40
Q-25 RASX	20	Q-EX 5/32	50	Q-FR 50/2S	Allihn	Q-CX 7/03	—	18× 55	57·00	6·40
Q-40 RASX	40	Q-EX 5/43	100	Q-FR 100/3S	,,	Q-CX 7/04	—	22× 80	60·00	6·60
Q-60 RASX	60	Q-EX 5/53	150	Q-FR 150/3S	,,	Q-CX 7/05	—	28× 80	61·00	6·80
Q-100 RASX	100	Q-EX 5/63	250	Q-FR 250/3S	,,	Q-CX 7/06	—	33×100	67·00	7·40
Q-200 RASX	200	Q-EX 5/83	500	Q-FR 500/3S	,,	Q-CX 7/08	—	41×130	77·00	8·60
Q-600 RDSX	600	Q-EX 5/75	2000	Q-FR 2L/5S	Davies	Q-CX 5/25	Q-DA 5/75	60×160	—	19·80
Q-2L RCSX	2000	Q-EX 5/105	5000	Q-FR 5L/5US	Coil	Q-C 13/55	Q-DA 5/100	90×200	—	37·20

All items on this page normally available from stock (code *m*).

FLASKS



Q-FR 25/1S



Q-FR 100/3M

FLASKS, round bottom, medium neck.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FR 50/1M	50	14/23	5·50	0·62
Q-FR 50/3M	50	24/29	5·50	0·62
Q-FR 100/1M	100	14/23	6·00	0·66
Q-FR 100/2M	100	19/26	6·00	0·66
Q-FR 100/3M	100	24/29	6·00	0·66
Q-FR 150/3M	150	24/29	6·50	0·72
Q-FR 250/2M	250	19/26	8·00	0·90
Q-FR 250/3M	250	24/29	7·50	0·84
Q-FR 500/3M	500	24/29	8·50	0·94
Q-FR 500/4U	500	29/32	9·00	1·00
Q-FR 500/5M	500	34/35	9·50	1·06
Q-FR 1L/3UM	1000	24/29	9·50	1·06
Q-FR 1L/4UM	1000	29/32	11·00	1·25
Q-FR 1L/5M	1000	34/35	11·50	1·30
Q-FR 2L/3M	2000	24/29	16·50	1·85
Q-FR 2L/5UM	2000	34/35	16·50	1·85

FLASKS, round bottom, short neck.

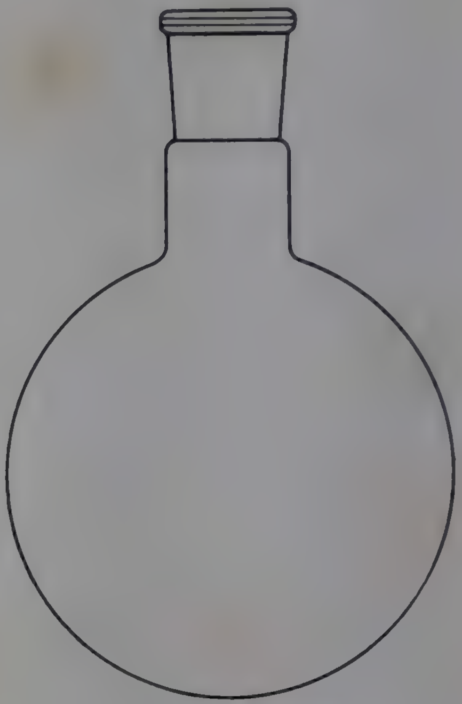
List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FR 5/0S	5	10/19	4·00	0·45
Q-FR 5/1S	5	14/23	3·70	0·42
Q-FR 10/1S	10	14/23	4·50	0·50
Q-FR 25/1S	25	14/23	4·50	0·50
Q-FR 25/2S	25	19/26	4·50	0·50
Q-FR 25/3S	25	24/29	4·50	0·50
Q-FR 50/1S	50	14/23	5·50	0·60
Q-FR 50/2S	50	19/26	5·50	0·60
Q-FR 50/3S	50	24/29	5·50	0·60
Q-FR 100/1S	100	14/23	6·00	0·66
Q-FR 100/2S	100	19/26	6·00	0·66
Q-FR 100/3S	100	24/29	6·00	0·66
Q-FR 100/4S	100	29/32	6·50	0·72
Q-FR 100/5S	100	34/35	7·00	0·78
Q-FR 150/2S	150	19/26	6·50	0·72
Q-FR 150/3S	150	24/29	6·50	0·72
Q-FR 150/5S	150	34/35	7·00	0·78
Q-FR 250/2S	250	19/26	7·50	0·84
Q-FR 250/3S	250	24/29	7·00	0·78
Q-FR 250/4S	250	29/32	7·50	0·84
Q-FR 250/5S	250	34/35	8·00	0·88
Q-FR 500/2S	500	19/26	8·50	0·94
Q-FR 500/3S	500	24/29	8·00	0·88
Q-FR 500/4S	500	29/32	9·00	1·00
Q-FR 500/5S	500	34/35	9·50	1·06
Q-FR 1L/3S	1000	24/29	9·00	1·00
Q-FR 1L/4S	1000	29/32	10·00	1·10
Q-FR 1L/5S	1000	34/35	11·50	1·30
Q-FR 2L/3S	2000	24/29	16·00	1·80
Q-FR 2L/4S	2000	29/32	15·50	1·70
Q-FR 2L/5S	2000	34/35	15·50	1·70
Q-FR 3L/3S	3000	24/29	20·50	2·30
Q-FR 3L/5S	3000	34/35	21·50	2·40
Q-FR 5L/5US	5000	34/35	32·50	3·60
Q-FR 5L/9S	5000	55/44	35·00	3·90

All items on this page normally available from stock (code *m*).

FLASKS

FLASKS, round bottom, short neck.

List No.	Capacity ml	Socket	Ten	Each
Clearfit			£	£
Q-KFR 5/1S	5	14/23	5·50	0·60
Q-KFR 10/1S	10	14/23	5·50	0·60
Q-KFR 25/1S	25	14/23	5·50	0·60
Q-KFR 25/2S	25	19/26	8·50	0·94
Q-KFR 25/3S	25	24/29	6·00	0·66
Q-KFR 50/1S	50	14/23	6·50	0·72
Q-KFR 50/2S	50	19/26	6·50	0·72
Q-KFR 50/3S	50	24/29	6·50	0·72
Q-KFR 50/4S	50	29/32	7·00	0·78
Q-KFR 100/1S	100	14/23	7·50	0·84
Q-KFR 100/2S	100	19/26	7·00	0·78
Q-KFR 100/3S	100	24/29	7·00	0·78
Q-KFR 100/4S	100	29/32	7·50	0·84
Q-KFR 150/2S	150	19/26	7·50	0·84
Q-KFR 150/3S	150	24/29	8·00	0·90
Q-KFR 250/2S	250	19/26	8·50	0·94
Q-KFR 250/3S	250	24/29	8·00	0·90
Q-KFR 250/4S	250	29/32	9·00	1·00
Q-KFR 500/2S	500	19/26	11·00	1·20
Q-KFR 500/3S	500	24/29	9·00	1·00
Q-KFR 500/4S	500	29/32	10·00	1·10
Q-KFR 1L/3S	1000	24/29	10·50	1·16
Q-KFR 1L/4S	1000	29/32	11·50	1·25
Q-KFR 2L/3S	2000	24/29	17·50	1·95
Q-KFR 2L/4S	2000	29/32	17·00	1·90
Q-KFR 3L/4S	3000	29/32	22·00	2·45
Q-KFR 5L/4S	5000	29/32	32·00	3·60

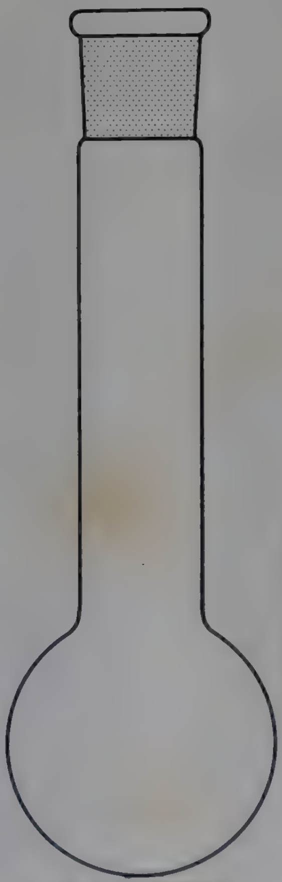


Q-KFR 500/4S

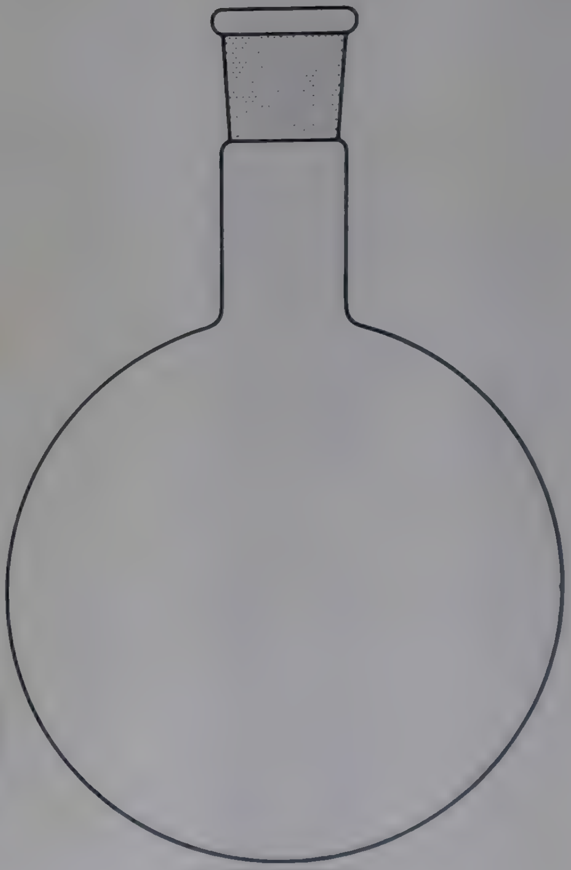
Standard joint flasks see FLASKS

FLASKS, round bottom, uniform height.
Joint size 24/29 and 29/32, flask height 205mm.
Joint size 34/35, flask height 275 mm.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FR 100/3U	100	24/29	6·50	0·72
Q-FR 250/3U	250	24/29	7·50	0·84
Q-FR 500/3U	500	24/29	8·50	0·94
Q-FR 500/4U	500	29/32	For prices see page 632	
Q-FR 1L/3UM	1000	24/29		
Q-FR 1L/4UM	1000	29/32		
Q-FR 2L/3US	2000	24/29	16·00	1·80
Q-FR 2L/5UM	2000	34/35	For prices see page 632	
Q-FR 5L/5US	5000	34/35		



Q-FR 100/3U



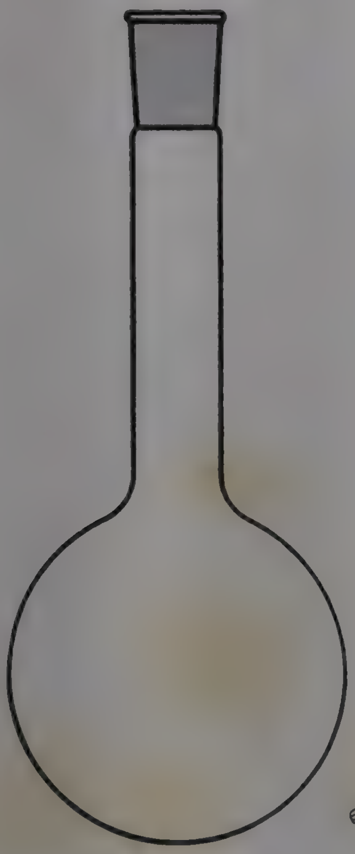
Q-FR 500/3U

All items on this page normally available from stock (code *m*).

FLASKS

FLASKS, round bottom, long neck.

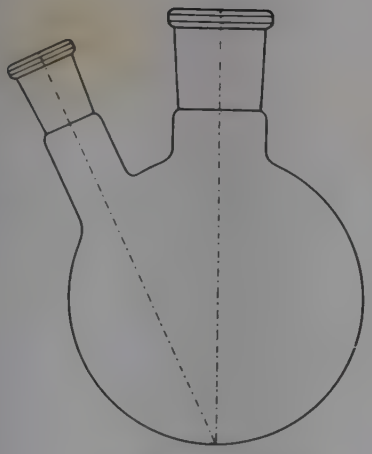
List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FR 100/3U	100	24/29	For price see entry on page 633	
Q-FR 250/3L	250	24/29	7·50	0·84
Q-FR 500/3L	500	24/29	9·50	1·04
Q-FR 1L/3L	1000	24/29	10·00	1·12



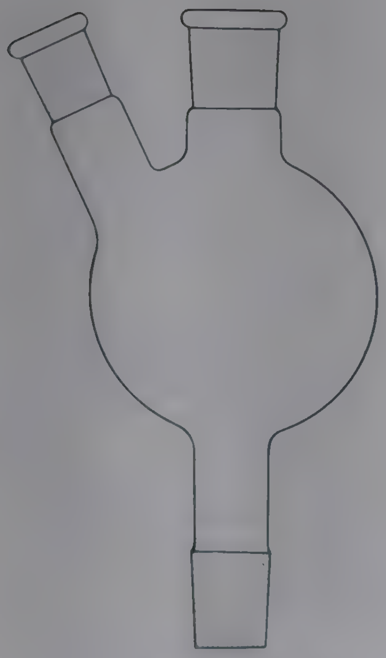
Q-FR 500/3L

FLASKS, round bottom, two necks. With short centre neck and angled side neck.

List No.	Capacity ml	Centre socket	Side socket	Ten	Each
Quickfit				£	£
Q-FR 100/3S/1A	100	24/29	14/23	12·00	1·35
Q-FR 250/3S/1A	250	24/29	14/23	12·50	1·40
Q-FR 250/3S/2A	250	24/29	19/26	14·00	1·55
Q-FR 500/3S/1A	500	24/29	14/23	14·00	1·55
Q-FR 500/3S/2A	500	24/29	19/26	15·00	1·65
Q-FR 1L/3S/1A	1000	24/29	14/23	16·00	1·80
Q-FR 2L/5S/2A	2000	34/35	19/26	24·50	2·70
Clearfit					
Q-KFR 100/3S/1A	100	24/29	14/23	14·50	1·60
Q-KFR 250/3S/1A	250	24/29	14/23	15·50	1·70
Q-KFR 250/3S/2A	250	24/29	19/26	16·00	1·80
Q-KFR 250/4S/4A	250	29/32	29/32	18·50	2·05
Q-KFR 500/4S/4A	500	29/32	29/32	19·00	2·10
Q-KFR 1L/3S/1A	1000	24/29	14/23	18·50	2·05



Q-KFR 250/3S/2A



Q-RA 332/250

FLASKS, round bottom, two necks and bottom outlet. Side socket size 19/26.

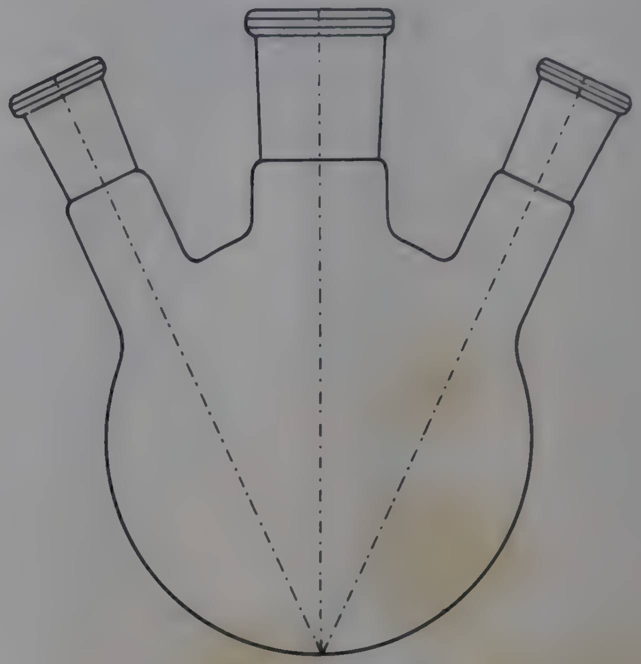
List No.	Capacity ml	Centre socket	Bottom cone	Ten	Each
Quickfit				£	£
Q-RA 332/250	250	24/29	24/29	24·00	2·65
Q-RA 552/500	500	34/35	34/35	26·00	2·90
Q-RA 552/1L	1000	34/35	34/35	28·00	3·10
Q-RA 552/2L	2000	34/35	34/35	38·00	4·20

All items on this page normally available from stock (code *m*).

FLASKS

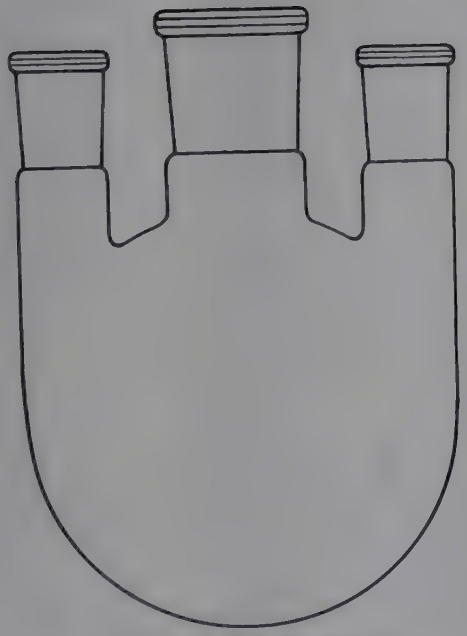
FLASKS, round bottom, three necks. With short centre neck and two angled side necks.

List No.	Capacity ml	Centre socket	Side sockets	Ten	Each
Quickfit				£	£
Q-FR 250/3S/11A	250	24/29	14/23	21·00	2·35
Q-FR 250/3S/22A	250	24/29	19/26	20·50	2·30
Q-FR 500/3S/11A	500	24/29	14/23	18·50	2·05
Q-FR 500/3S/22A	500	24/29	19/26	22·00	2·45
Q-FR 1L/3S/11A	1000	24/29	14/23	20·50	2·30
Q-FR 1L/3S/22A	1000	24/29	19/26	23·00	2·55
Q-FR 1L/5S/22A	1000	34/35	19/26	25·50	2·80
Q-FR 2L/3US/22A	2000	24/29	19/26	32·50	3·60
Q-FR 2L/5S/22A	2000	34/35	19/26	31·50	3·50
Clearfit					
Q-KFR 250/2S/22A	250	19/26	19/26	21·50	2·40
Q-KFR 250/3S/22A	250	24/29	19/26	23·50	2·60
Q-KFR 250/3S/11A	250	24/29	14/23	17·00	1·90
Q-KFR 250/4S/11A	250	29/32	14/23	18·00	2·00
Q-KFR 500/2S/22A	500	19/26	19/26	27·00	3·00
Q-KFR 500/3S/22A	500	24/29	19/26	25·00	2·75
Q-KFR 500/4S/11A	500	29/32	14/23	20·00	2·20
Q-KFR 1L/3S/22A	1000	24/29	19/26	27·50	3·10
Q-KFR 1L/4S/44A	1000	29/32	29/32	34·50	3·80



Q-KFR 500/3S/22A

FLASKS, round bottom, three parallel necks.



Q-KFR 500/3S/22P

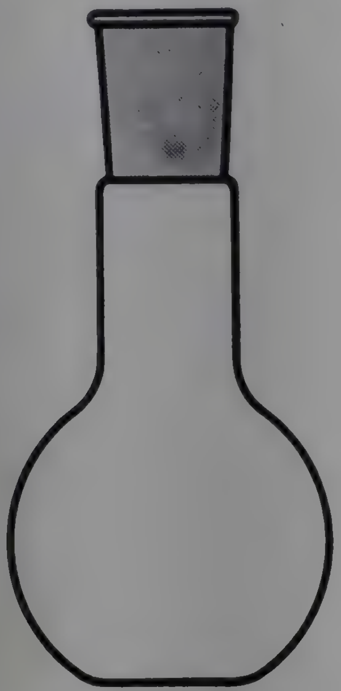
List No.	Capacity ml	Centre socket	Side sockets	Ten	Each
Quickfit				£	£
Q-FR 250/3S/22P	250	24/29	19/26	22·00	2·45
Q-FR 500/3S/22P	500	24/29	19/26	24·00	2·65
Q-FR 1L/3S/22P	1000	24/29	19/26	29·50	3·30
Q-FR 1L/5S/22P	1000	24/29	19/26	26·50	2·95
Q-FR 2L/3US/22P	2000	24/29	19/26	33·50	3·70
Q-FR 2L/5S/22P	2000	34/35	19/26	33·00	3·60
Q-FR 2L/5S/33P	2000	34/35	24/29	35·50	3·90
Q-FR 3L/5S/22P	3000	34/35	19/26	43·50	4·80
Q-FR 3L/5S/33P	3000	34/35	24/29	45·50	5·10
Q-FR 5L/5US/33P	5000	34/35	24/29	55·50	6·20
Clearfit					
Q-KFR 250/3S/22P	250	24/29	19/26	25·00	2·75
Q-KFR 250/4S/11P	250	29/32	14/23	24·50	2·70
Q-KFR 500/3S/22P	500	24/29	19/26	26·50	2·95
Q-KFR 500/4S/11P	500	29/32	14/23	25·00	2·75
Q-KFR 500/4S/44P	500	29/32	29/32	31·00	3·50
Q-KFR 1L/3S/22P	1000	24/29	19/26	24·50	2·70
Q-KFR 1L/4S/44P	1000	29/32	29/32	36·00	4·00
Q-KFR 2L/4S/44P	2000	29/32	29/32	40·00	4·40
Q-KFR 3L/4S/44P	3000	29/32	29/32	48·50	5·40
Q-KFR 5L/4S/44P	5000	29/32	29/32	57·50	6·40

All items on this page normally available from stock (code *m*).

FLASKS

FLASKS, flat bottom, medium neck.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FF 100/3M	100	24/29	6·00	0·66
Q-FF 150/3M	150	24/29	6·50	0·72
Q-FF 250/2M	250	19/26	7·50	0·84
Q-FF 250/3M	250	24/29	7·50	0·84
Q-FF 250/4M	250	29/32	7·50	0·84
Q-FF 500/3UM	500	24/29	8·00	0·88
Q-FF 500/4UM	500	29/32	8·50	0·94
Q-FF 1L/3M	1000	24/29	9·50	1·04

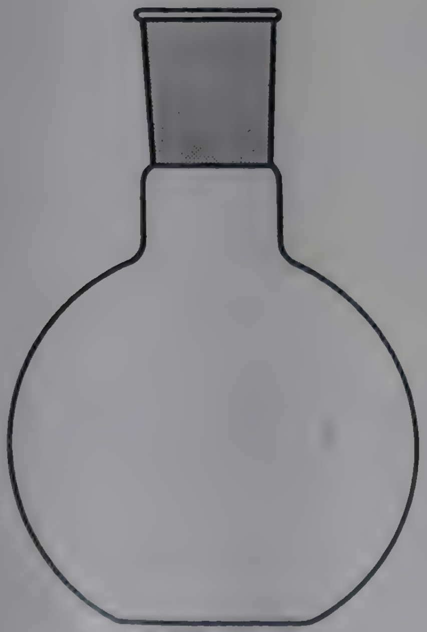


Q-FF 250/3M

FLASKS, flat bottom, short neck.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FF 50/2S	50	19/26	5·50	0·60
Q-FF 50/3S	50	24/29	5·00	0·55
Q-FF 100/2S	100	19/26	6·00	0·66
Q-FF 100/3S	100	24/29	6·00	0·66
Q-FF 100/5S	100	34/35	7·00	0·78
Q-FF 150/2S	150	19/26	6·50	0·72
Q-FF 150/3S	150	24/29	6·50	0·72
Q-FF 150/4S	150	29/32	6·50	0·72
Q-FF 150/5S	150	34/35	7·00	0·78
Q-FF 250/2S	250	19/26	7·50	0·84
Q-FF 250/3S	250	24/29	7·00	0·78
Q-FF 250/4S	250	29/32	7·50	0·84
Q-FF 250/5S	250	34/35	8·00	0·88
Q-FF 350/3S	350	24/29	8·50	0·94
Q-FF 500/3S	500	24/29	7·50	0·84
Q-FF 500/4S	500	29/32	8·50	0·94
Q-FF 500/5S	500	34/35	9·00	1·00
Q-FF 1L/3US	1000	24/29	9·50	1·04
Q-FF 1L/4US	1000	29/32	10·00	1·10
Q-FF 1L/5S	1000	34/35	11·00	1·20
Q-FF 2L/3S	2000	24/29	16·00	1·80
Q-FF 2L/4S	2000	29/32	16·50	1·85
Q-FF 2L/5S	2000	34/35	16·00	1·80
Clearfit				
Q-KFF 100/3S	100	24/29	7·50	0·84
Q-KFF 150/3S	150	24/29	8·00	0·88
Q-KFF 250/3S	250	24/29	8·00	0·88
Q-KFF 500/3S	500	24/29	8·50	0·94

FLASKS, flat bottom, with standard joints, capacities 150 ml to 500 ml—see FJ-110 in List No. sequence.



Q-FF 500/4S

FLASKS, flat bottom, uniform height, (170 mm).

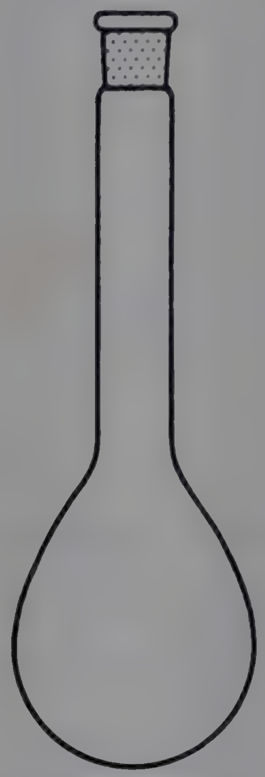
List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FF 250/3U	250	24/29	7·50	0·84
Q-FF 500/3UM	500	24/29	See entries above for prices	
Q-FF 500/4UM	500	29/32		
Q-FF 1L/3US	1000	24/29		
Q-FF 1L/4US	1000	29/32		

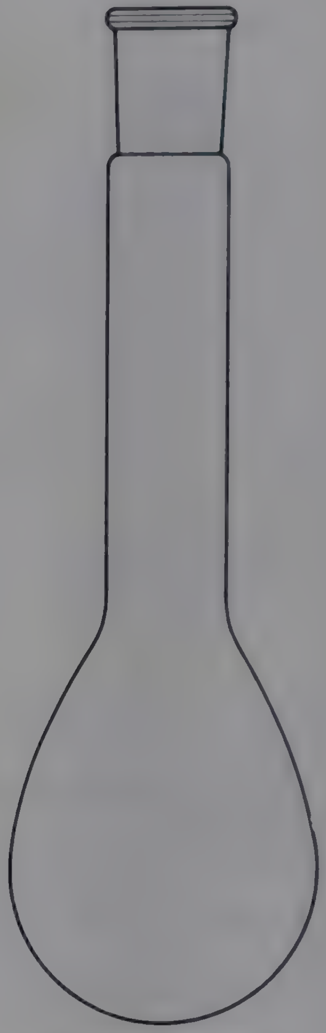
All items on this page normally available from stock (code *m*).

FLASKS

FLASKS, Kjeldahl, long neck, round bottom.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FK 100/3L	100	24/29	**8·00**	**0·88**
Q-FK 200/3L	200	24/29	**8·50**	**0·94**
Q-FK 300/3L	300	24/29	**9·00**	**1·00**
Q-FK 500/3L	500	24/29	**9·50**	**1·06**
Q-FK 800/3L	800	24/29	**12·00**	**1·35**
Clearfit				
Q-KFK 300/3L	300	24/29	**10·00**	**1·10**
Q-KFK 500/3L	500	24/29	**10·50**	**1·16**
Q-KFK 800/3L	800	24/29	**13·50**	**1·50**

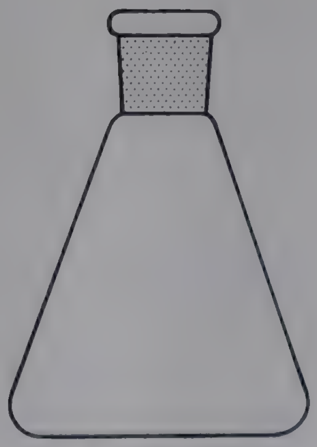

Q-FK 200/3L

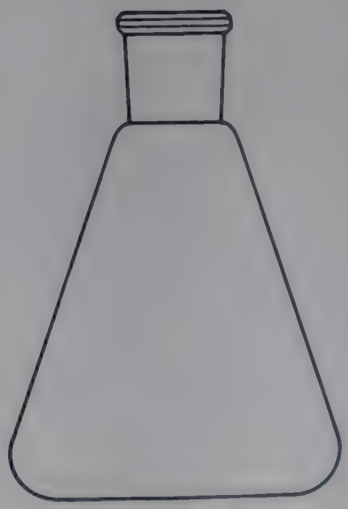

Q-KFK 500/3L

FLASKS, conical.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FE 5/0	5	10/19	**6·50**	**0·72**
Q-FE 10/1	10	14/23	**6·50**	**0·72**
Q-FE 25/0	25	10/19	**6·00**	**0·66**
Q-FE 25/1	25	14/23	**6·00**	**0·66**
Q-FE 50/1	50	14/23	**6·00**	**0·66**
Q-FE 50/2	50	19/26	**6·00**	**0·66**
Q-FE 50/3	50	24/29	**6·00**	**0·66**
Q-FE 100/1	100	14/23	**7·00**	**0·78**
Q-FE 100/2	100	19/26	**6·50**	**0·72**
Q-FE 100/3	100	24/29	**6·50**	**0·72**
Q-FE 150/2	150	19/26	**7·50**	**0·84**
Q-FE 150/3	150	24/29	**7·50**	**0·84**
Q-FE 250/2	250	19/26	**7·50**	**0·84**
Q-FE 250/3	250	24/29	**7·00**	**0·78**
Q-FE 250/4	250	29/32	**7·50**	**0·84**
Q-FE 250/5	250	34/35	**7·50**	**0·84**
Q-FE 350/3	350	24/29	**7·50**	**0·84**
Q-FE 500/3	500	24/29	**7·50**	**0·84**
Q-FE 500/4	500	29/32	**8·50**	**0·94**
Q-FE 500/5	500	34/35	**8·00**	**0·88**
Q-FE 1L/3	1000	24/29	**9·50**	**1·04**
Q-FE 1L/4	1000	29/32	**10·00**	**1·10**
Q-FE 1L/5	1000	34/35	**10·00**	**1·10**
Q-FE 2L/5	2000	34/35	**16·50**	**1·85**
Clearfit				
Q-KFE 10/1	10	14/23	**7·50**	**0·84**
Q-KFE 25/1	25	14/23	**7·00**	**0·78**
Q-KFE 50/1	50	14/23	**7·00**	**0·78**
Q-KFE 50/2	50	19/26	**7·00**	**0·78**
Q-KFE 50/3	50	24/29	**7·00**	**0·78**
Q-KFE 100/2	100	19/26	**7·50**	**0·84**
Q-KFE 100/3	100	24/29	**7·50**	**0·84**
Q-KFE 150/3	150	24/29	**8·50**	**0·94**
Q-KFE 250/3	250	24/29	**8·50**	**0·94**
Q-KFE 250/4	250	29/32	**8·50**	**0·94**
Q-KFE 500/3	500	24/29	**9·00**	**1·00**
Q-KFE 500/4	500	29/32	**9·50**	**1·04**
Q-KFE 1L/3	1000	24/29	**11·00**	**1·25**

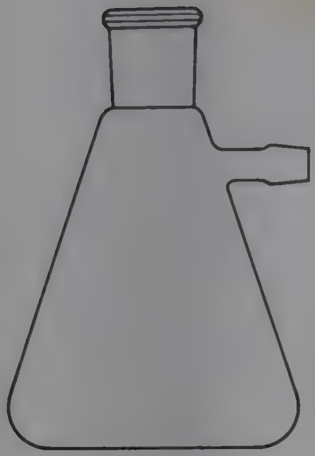
Ⓐ **FLASKS, conical,** 24/29 socket, capacities 100 ml to 1000 ml—see FJ-058 in List No. sequence.


Q-FE 250/3

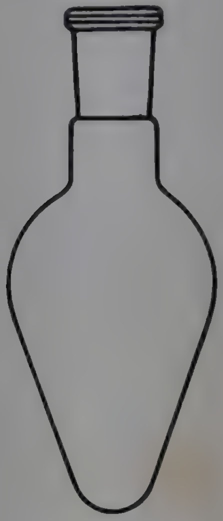

Q-KFE 250/3

All items on this page normally available from stock (code *m*).

FLASKS



Q-KFB 250/3



Q-KFP 10/1

FLASKS, Buchner or filtration.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FB 100/2	100	19/26	13·00	1·45
Q-FB 250/3	250	24/29	15·50	1·70
Q-FB 500/3	500	24/29	16·50	1·85
Q-FB 1L/3	1000	24/29	23·00	2·55
Clearfit				
Q-KFB 100/2	100	19/26	14·00	1·55
Q-KFB 100/3	100	24/29	14·00	1·55
Q-KFB 250/3	250	24/29	16·50	1·85
Q-KFB 250/4	250	29/32	17·00	1·90
Q-KFB 500/3	500	24/29	18·00	2·00
Q-KFB 500/4	500	29/32	18·50	2·05
Q-KFB 1L/3	1000	24/29	24·50	2·70

STANDARD JOINT FLASKS

FILTER FLASKS, 29/32 socket, capacities 500 ml and 1000 ml—see FJ-280.

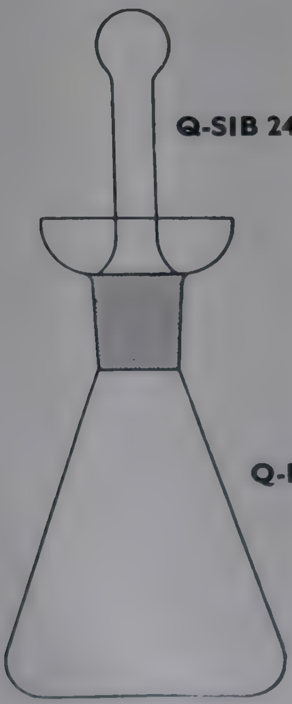
IODINE FLASK, 24/29 cone and socket, capacity 250 ml —see FJ-260.

PEAR SHAPED FLASKS, 14/15 sockets, capacities 10 ml and 30 ml, single and two necks—see FJ-195 and FJ-196.

For full details and prices see entries in List No. sequence.

FLASKS, iodine, to BS 2735.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FIB 250/3	250	24/29	17·00	1·90
Q-FIB 500/3	500	24/29	19·00	2·10
Q-SIB 24 STOPPER, for iodine flasks			For price see entry on page 649.	



Q-SIB 24

Q-FIB 250/3

PEAR SHAPED SEMI-MICRO FLASKS

Single neck

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FP 5/0	5	10/19	5·80	0·64
Q-FP 10/1	10	14/23	5·80	0·64
Q-FP 25/0	25	10/19	6·50	0·72
Q-FP 25/1	25	14/23	5·80	0·64
Q-FP 50/1	50	14/23	5·80	0·64
Q-FP 100/2	100	19/26	8·00	0·88
Clearfit				
Q-KFP 5/1	5	14/23	6·50	0·72
Q-KFP 10/1	10	14/23	6·90	0·76
Q-KFP 25/1	25	14/23	7·40	0·82
Q-KFP 50/1	50	14/23	8·00	0·88

All items on this page normally available from stock (code *m*).

FLASKS

SEMI-MICRO FLASKS
(continued)

Two necks, side neck at angle

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FP 50/1/1A	50	14/23	12·70	1·40
Clearfit				
Q-KFP 50/1/1A	50	14/23	16·50	1·85

Three necks, one side neck parallel, other angled

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-FP 25/0AP	25	10/19	19·60	2·20

Distillation

List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-MD 2/10	10	14/23	14/23	12·50	1·40
Q-MD 2/25	25	14/23	14/23	11·50	1·30
Q-MD 2/50	50	14/23	14/23	12·50	1·40
Q-MD 2/100	100	14/23	14/23	14·50	1·60

Claisen

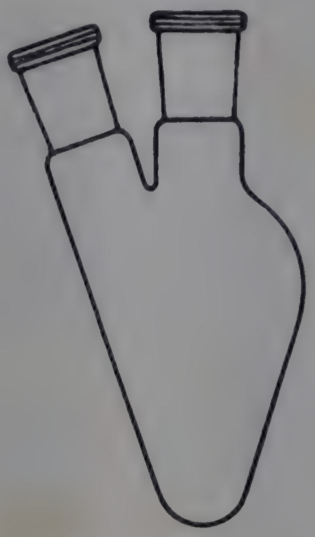
List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-MD 3/10	10	14/23	14/23	19·00	2·10
Q-MD 3/0/25	25	10/19	10/19	18·00	2·00
Q-MD 3/25	25	14/23	14/23	18·50	2·05
Q-MD 3/50	50	14/23	14/23	19·00	2·10
Q-MD 3/100	100	14/23	14/23	20·50	2·30

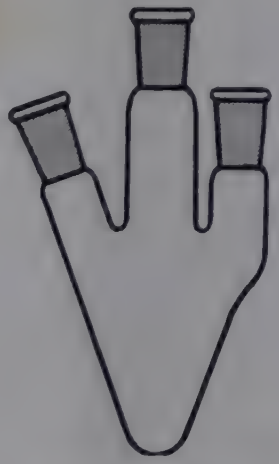
Claisen—Vigreux

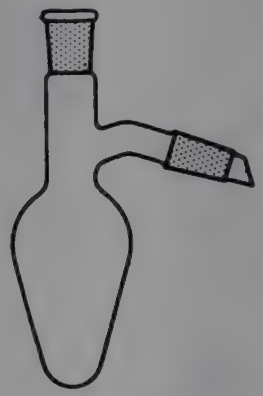
List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-MD 4/25	25	14/23	14/23	24·00	2·65
Q-MD 4/50	50	14/23	14/23	24·50	2·70
Q-MD 4/100	100	14/23	14/23	26·50	2·95

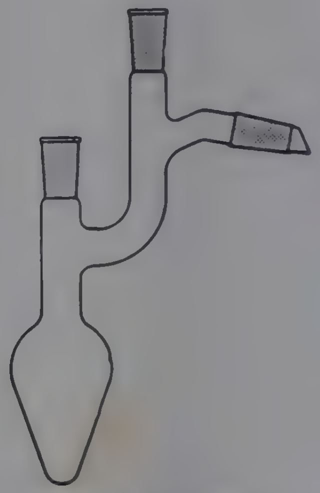
Vigreux—with angled neck, main socket 14/23.

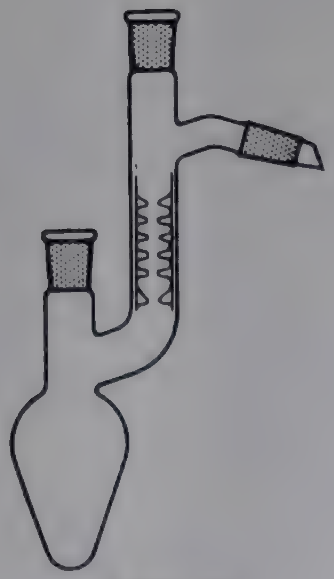
List No.	Capacity ml	Angle socket	Side cone	Ten	Each
Quickfit				£	£
Q-MD 7/10	10	10/19	14/23	23·50	2·60
Q-MD 7/25	25	10/19	14/23	23·50	2·60
Q-MD 7/50	50	10/19	14/23	24·00	2·65

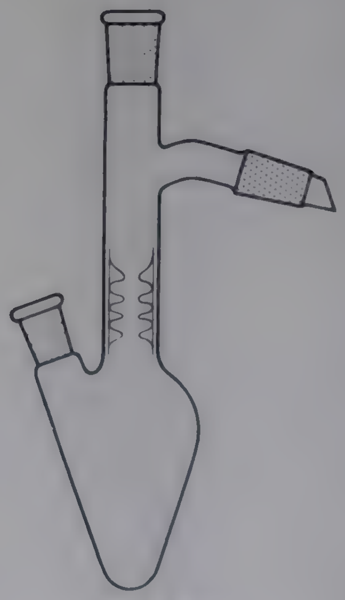

Q-KFP 50/1/1A


Q-FP 25/0AP


Q-MD 2/25


Q-MD 3/10


Q-MD 4/25

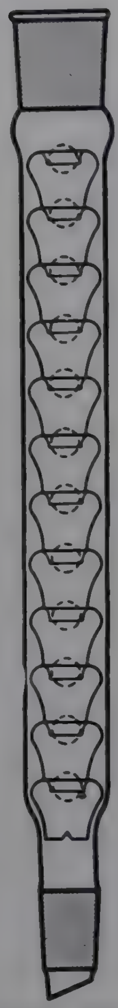

Q-MD 7/50

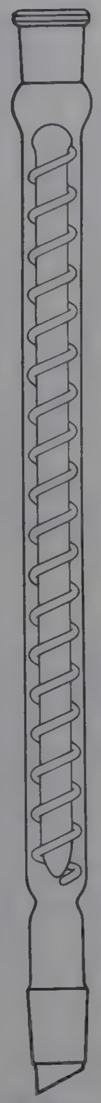
All items on this page normally available from stock (code *m*).

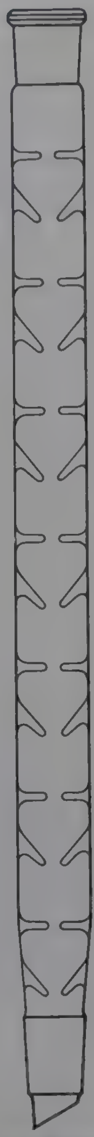
FRACTIONATION

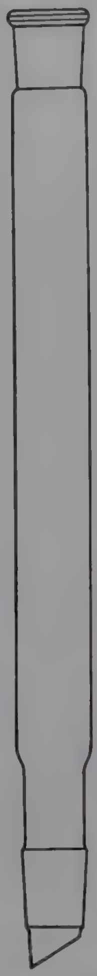
FRACTIONATING COLUMNS

List No.	Type	Socket	Cone	Effective length mm	Ten	Each
Quickfit					£	£
Q-FC 1/22	Dufton	19/26	19/26	300	33·00	3·70
Q-FC 2/23	Dufton	24/29	24/29	300	38·00	4·20
Q-FC 3/13	Vigreux	24/29	24/29	360	27·00	3·00
Q-FC 6/23A	Jacket only to take 12 bulbs (and bubbles)	34/35	24/29	225	25·80	2·85
Q-FC 6/00	Pear bulbs, for above	—	—	—	2·70	0·33
Q-FC 6/10	Bubbles, for above	—	—	—	1·40	0·21
Q-FC 7/23	Plain columns ...	24/29	24/29	250	For prices see entries on page 627	
Q-FC 7/43	Plain columns ...	24/29	24/29	500		
Q-FC 7/53	Plain columns ...	24/29	24/29	750		
Q-FC 8/23	Plain columns ...	34/35	24/29	250	14·50	1·60
Q-FC 8/43	Plain columns ...	34/35	24/29	500	20·00	2·20
Clearfit						
Q-KFC 1/22	Dufton	19/26	19/26	300	35·00	3·90
Q-KFC 2/23	Dufton	24/29	24/29	300	40·50	4·50
Q-KFC 3/13	Vigreux	24/29	24/29	360	29·50	3·30
Q-KFC 3/14	Vigreux	29/32	29/32	360	33·50	3·70
Q-KFC 3/23	Vigreux	24/29	24/29	600	47·00	5·20
Q-KFC 7/23	Plain columns ...	24/29	24/29	250	14·50	1·60
Q-KFC 7/43	Plain columns ...	24/29	24/29	500	17·00	1·90
Q-KFC 7/44	Plain columns ...	29/32	29/32	500	20·50	2·25
Q-KFC 7/53	Plain columns ...	24/29	24/29	750	20·00	2·20


Q-FC 6/23A with Q-FC 6/00 and Q-FC 6/10


Q-KFC 2/23

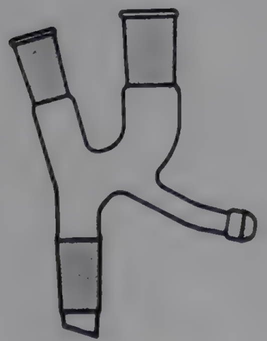

Q-KFC 3/13


Q-KFC 7/23

Ⓐ **Standard joint fractionating columns and stillheads see entries under page heading DISTILLATION**

REFLUX HEADS

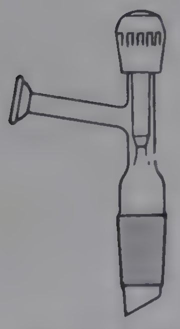
List No.	Description	Socket for reflux condenser	Thermo socket	Cone for column	Cone for condenser	Ten	Each
Quickfit						£	£
Q-FC 14/00	Cold finger condenser ...	—	—	—	19/26	For price see entry on page 629	
Q-FC 15/32	Sluice type head ...	19/26	14/23	24/29	—	25·50	2·85
Q-FC 15/2	Distillate delivery adapter with fine adjustment stopcock for Q-FC 15/32			—	19/26	56·00	6·20
Clearfit							
Q-KFC 14/00	Cold finger condenser ...	—	—	—	19/26	For price see entry on page 629	


Q-FC 15/32

PACKING, for plain columns, in bags of 1 litre.

List No.	Description	Diameter mm	Effective length mm	10 Bags	Bag
Quickfit				£	£
Q-FC 8/06	Raschig rings ...	6	6	29·00	3·20

For suitable spiral supports for column packing see Q-EX 13/12 and Q-EX 13/23 on page 630.


Q-FC 15/2

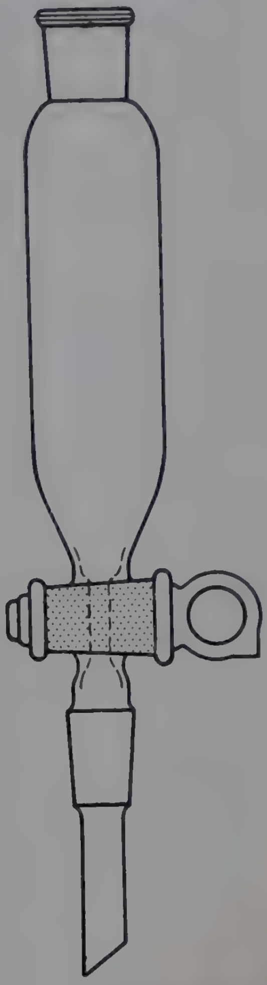
All items on this page normally available from stock (code *m*).

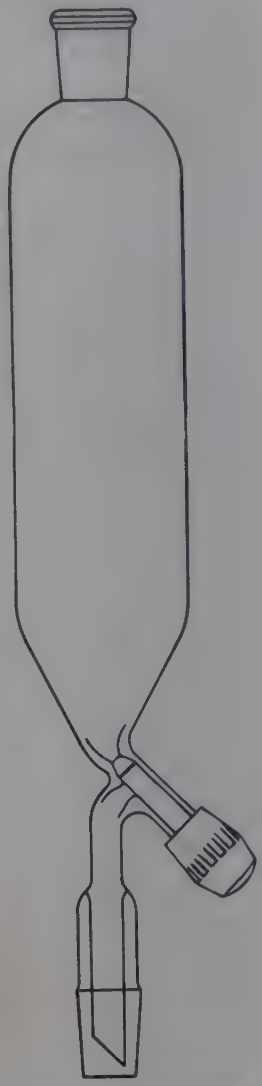
FUNNELS

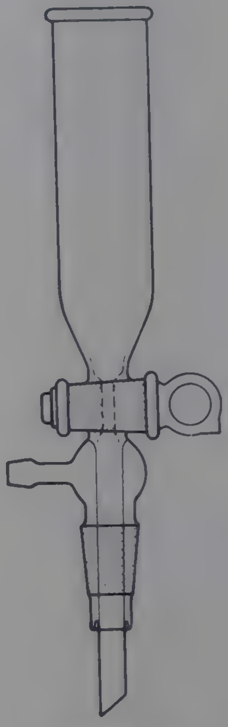
SEPARATING AND DROPPING FUNNELS

Cylindrical, with socket and cone.

List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-D 1/00	20	10/19	10/13	25·50	2·80
Q-D 1/01	25	14/23	14/23	24·00	2·65
Q-D 1/11	50	14/23	14/23	24·00	2·65
Q-D 1/21	100	14/23	14/23	25·50	2·80
Q-D 1/22	100	19/26	19/26	27·50	3·10
Q-D 1/32	250	19/26	19/26	37·00	4·10
Q-D 1/42	500	19/26	19/26	41·00	4·60
Q-D 1/62	1000	19/26	19/26	47·00	5·20
Clearfit					
Q-KD 1/11	50	14/23	14/23	25·00	2·75
Q-KD 1/21	100	14/23	14/23	27·00	3·00
Q-KD 1/22	100	19/26	19/26	29·00	3·20
Q-KD 1/2/44	100	29/32	29/32	30·00	3·30
Q-KD 1/32	250	19/26	19/26	38·50	4·10
Q-KD 1/34	250	29/32	29/32	39·50	4·40
Q-KD 1/44	500	29/32	29/32	42·00	4·70
Q-KD 1/64	1000	29/32	29/32	48·00	5·40
Clearfit/Rotaflo					
Q-KD 31/1/50	50	14/23	14/23	39·00	4·30
Q-KD 31/1/100	100	14/23	14/23	40·00	4·40
Q-KD 31/2/100	100	19/26	19/26	42·50	4·70
Q-KD 31/2/250	250	19/26	19/26	51·50	5·70
Q-KD 31/2/500	500	19/26	19/26	56·00	6·20


Q-KD 1/22


Q-KD 31/2/100


Q-D 4/23

(AS) **Cylindrical dropping funnel,** 14/15 standard joints, capacity 30 ml—see FP-587 in List No. sequence.

Cylindrical, with socket and plain stem.

List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-D 11/25	25	14/23	—	20·50	2·30
Q-D 11/50	50	14/23	—	21·00	2·30
Q-D 12/100	100	19/26	—	22·00	2·45
Q-D 12/250	250	19/26	—	28·50	3·20
Q-D 12/500	500	19/26	—	31·50	3·50

Cylindrical, open top and cone.

List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-D 3/12	50	—	19/26	27·50	3·10
Q-D 3/22	100	—	19/26	28·00	3·10
Q-D 3/32	250	—	19/26	30·00	3·30

Cylindrical, open top, with gas outlet tube.

List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-D 4/23	100	—	24/29	41·00	4·50

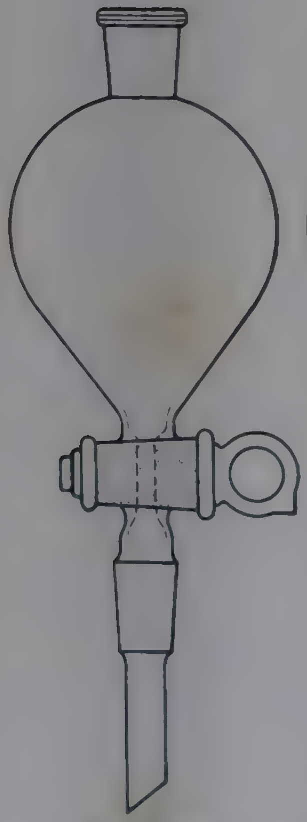
All items on this page normally available from stock (code *m*).

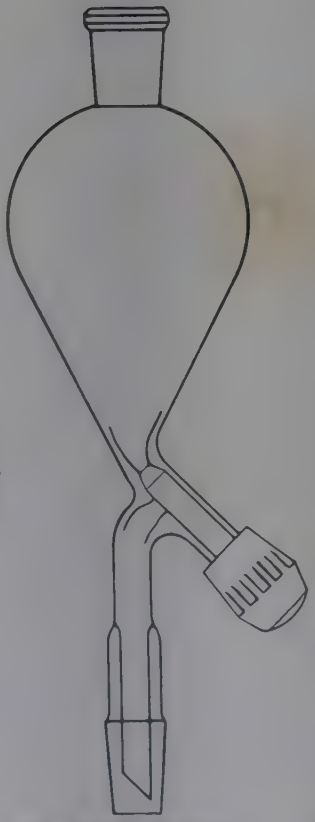
FUNNELS

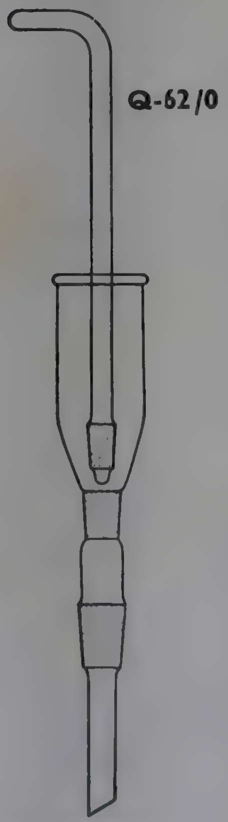
SEPARATING AND DROPPING FUNNELS
(continued)

Conical, with socket and short stem.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-D 82/100	100	19/26	**26·50**	**2·95**
Q-D 83/250	250	24/29	**34·50**	**3·80**
Q-D 83/500	500	24/29	**41·50**	**4·60**
Q-D 84/1L	1000	29/32	**45·00**	**5·00**


Q-KD 2/32


Q-KD 32/2/250



Q-D 62/50

Pear shape, with socket and cone.

List No.	Capacity ml	Socket	Cone	Ten	Each
Quickfit				£	£
Q-D 2/01	25	14/23	14/23	**25·00**	**2·75**
Q-D 2/11	50	14/23	14/23	**25·50**	**2·80**
Q-D 2/12	50	19/26	19/26	**26·50**	**2·95**
Q-D 2/21	100	14/23	14/23	**26·50**	**2·95**
Q-D 2/22	100	19/26	19/26	**27·00**	**3·00**
Q-D 2/31	250	14/23	14/23	**30·00**	**3·30**
Q-D 2/32	250	19/26	19/26	**31·00**	**3·40**
Q-D 2/42	500	19/26	19/26	**32·00**	**3·60**
Q-D 2/62	1000	19/26	19/26	**44·00**	**4·90**
Clearfit					
Q-KD 2/11	50	14/23	14/23	**27·00**	**3·00**
Q-KD 2/21	100	14/23	14/23	**27·50**	**3·10**
Q-KD 2/22	100	19/26	19/26	**28·00**	**3·10**
Q-KD 2/31	250	14/23	14/23	**31·50**	**3·50**
Q-KD 2/32	250	19/26	19/26	**32·00**	**3·60**
Q-KD 2/42	500	19/26	19/26	**33·00**	**3·70**
Clearfit/Rotaflo					
Q-KD 32/1/50	50	14/23	14/23	**41·00**	**4·60**
Q-KD 32/1/100	100	14/23	14/23	**41·00**	**4·60**
Q-KD 32/2/100	100	19/26	19/26	**41·50**	**4·60**
Q-KD 32/2/250	250	19/26	19/26	**44·50**	**4·90**
Q-KD 32/2/500	500	19/26	19/26	**52·50**	**5·80**

Pear shape, with socket and plain stem.

List No.	Capacity ml	Socket	Ten	Each
Quickfit			£	£
Q-D 22/50	50	19/26	**22·50**	**2·50**
Q-D 22/100	100	19/26	**23·00**	**2·55**
Q-D 22/250	250	19/26	**27·00**	**3·00**
Q-D 22/500	500	19/26	**29·50**	**3·30**
Q-D 22/1L	1000	19/26	**38·50**	**4·30**

Plug type, stem with cone, 50 ml capacity.

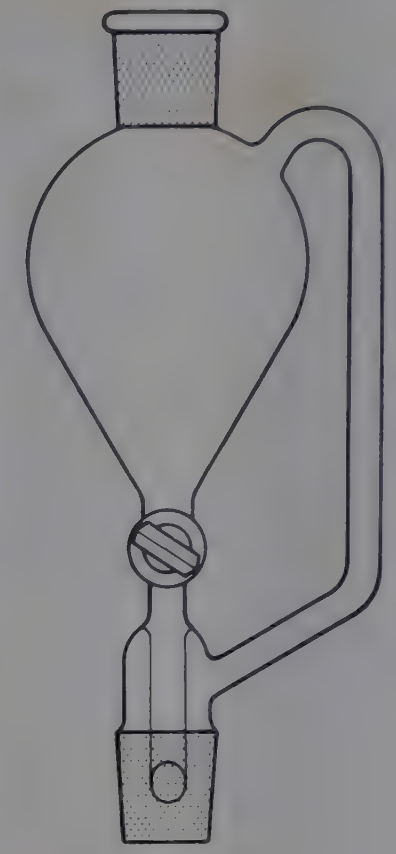
List No.	Part	Socket	Cone	Ten	Each
Quickfit				£	£
Q-D 62/50	Funnel	10/19	19/26	**17·50**	**1·95**
Q-D 62/0	Plug	—	10/19	**5·30**	**0·58**

All items on this page normally available from stock (code *m*).

FUNNELS

PRESSURE EQUALISATION FUNNELS

List No.	Type	Capacity ml	Socket	Cone	Ten	Each
Quickfit					£	£
Q-DE 100/22	Pear shape	100	19/26	19/26	**45·00**	**5·00**
Q-DE 250/33	Pear shape	250	24/29	24/29	**52·00**	**5·80**
Q-DEC 500/33	Cylindrical	500	24/29	24/29	**56·00**	**6·20**


Q-DE 250/33

INTERCHANGEABLE KEYS and retaining rings

List No.	Key bore	To fit	Retaining ring	Ten	Each
Quickfit				£	£
Q-D 5/1	1 mm	D 1/00, SC 10/1	—	**6·50**	**0·72**
Q-D 5/42	2 mm	DE, DEC, D funnels MF 11, MF 14 adapters SC 10/4, SC 10/42 stopcocks	D 5/4R	**6·40**	**0·70**
Q-D 5/4	4 mm	Ditto	D 5/4R	**6·00**	**0·66**
Q-D 5/4R	**Plastics retaining rings,** for above keys. In pack of six.			5 packs **1·00**	Pack **0·26**

FILTER FUNNEL, with perforated plate, Hirsch type.

List No.	Disk dia.	Cone	Ten	Each
Quickfit			£	£
Q-SF 42/2	24 mm	19/26	**18·00**	**2·00**

SINTAGLASS FILTER FUNNELS

- — **24/29 or 29/32 cone on stems**
- — **capacities 140 to 2500 ml**
- — **porosities 3, 4 and 5**

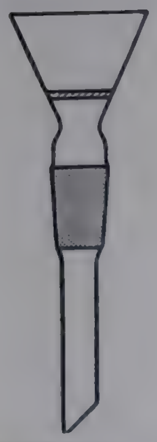
For details and prices see FM-703 et seq. in List No. sequence.

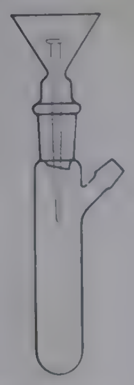
WILLSTATTER FILTER

The precipitate is retained on a small circle of filter paper (cut with a cork borer) supported on the glass 'nail'.

List No.	Description	Joint	Ten	Each
Quickfit			£	£
Q-17 MU	**Assembly**	10/19	**18·00**	**2·00**
	Components			
Q-MU 39/10/0	Filter funnel	10/19	**8·50**	**0·94**
Q-MU/WN	Willstatter nail		**2·50**	**0·31**
Q-MD 60	Receiver tube	10/19	For price see entry on page 644	

(AG) **Willstatter filter,** 14/15 cone, capacity 5 ml—see FP-290 in List No. sequence.

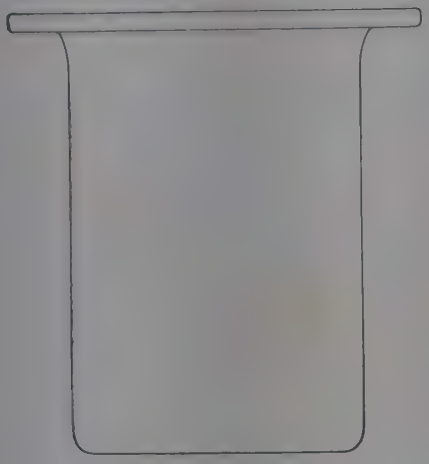

Q-SF 42/2


Q-17MU

All items on this page normally available from stock (code *m*).

REACTION VESSELS

For explanation of flat flange sizes and additional information see page 625.

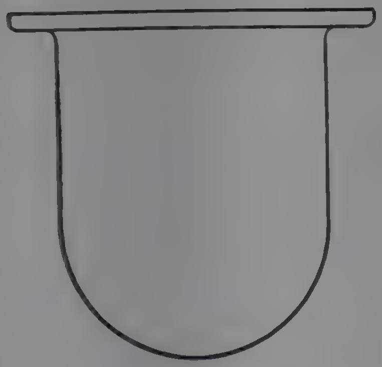


Q-FV 1L

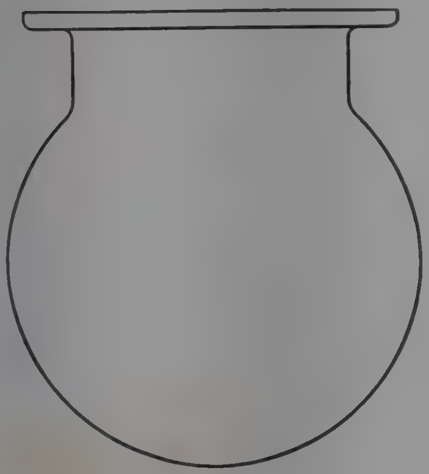
Flat bottom (Culture Vessels)

List No.	Capacity ml	Flange i.d. mm	JR-260 clip to fit	Ten	Each
Quickfit				£	£
Q-FV 500	500	75	JC 75F	33·00	3·70
Q-FV 1L	1000	100	JC 100F	30·00	3·30

Q-FV 1L is not suitable for use under vacuum.



Q-FR 700F



Q-FR 2LF

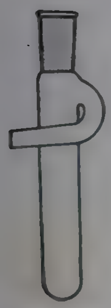
Round bottom

List No.	Capacity ml	Flange i.d. mm	JR-260 clip to fit	Ten	Each
Quickfit				£	£
Q-FR 100F	100	50	JC 50F	19·00	2·10
Q-FR 250F	250	75	JC 75F	24·00	2·65
Q-FR 500F	500	75	JC 75F	27·00	3·00
Q-FR 700F	700	100	JC 100F	33·00	3·70
Q-FR 1LF	1000	100	JC 100F	32·50	3·60
Q-FR 2LF	2000	100	JC 100F	40·00	4·40
Q-FR 5LF	5000	100	JC 100F	53·50	5·90
Q-FR 10LF	10,000	100	JC 100F	62·00	7·00
Q-FR 20LF	20,000	100	JC 100F	—	10·10

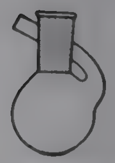
LIDS, for above vessels see flat flange adapters, page 625.

JR-260 Joint clips. For details and prices see entry in List No. sequence.

RECEIVERS



Q-MD 61

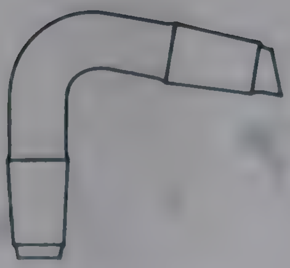


Q-MD 62

List No.	Capacity approx.	Socket	Ten	Each
Quickfit			£	£
Q-MD 60	5 ml	10/19	7·50	0·84
Q-MD 61	10 ml	14/23	7·50	0·84
Q-MD 62	25 ml	14/23	7·50	0·84

STILLHEADS

RECOVERY BENDS, sloping.



Q-KSH 1/22

List No.	Flask cone	Condenser cone	Ten	Each
Quickfit			£	£
Q-SH 1/11	14/23	14/23	5·50	0·62
Q-SH 1/22	19/26	19/26	6·50	0·72
Q-SH 1/23	24/29	19/26	8·00	0·88
Q-SH 1/33	24/29	24/29	8·00	0·88
Clearfit				
Q-KSH 1/11	14/23	14/23	9·00	1·00
Q-KSH 1/22	19/26	19/26	9·50	1·06
Q-KSH 1/33	24/29	24/29	11·00	1·25

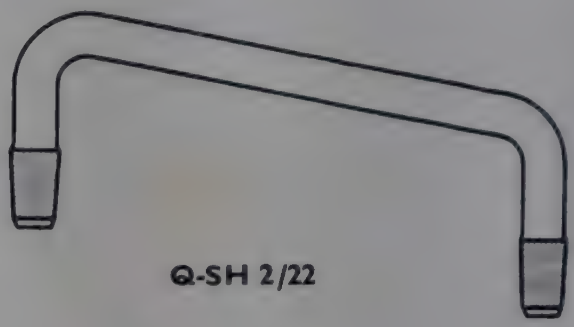
All items on this page normally available from stock (code *m*).

STILLHEADS

(continued)

RECOVERY BENDS, vertical.

List No.	Flask cone	Condenser cone	Ten	Each
Quickfit			£	£
Q-SH 2/11	14/23	14/23	7·00	0·78
Q-SH 2/22	19/26	19/26	9·50	1·06
Q-SH 2/23	24/29	19/26	11·00	1·25
Q-SH 2/33	24/29	24/29	12·00	1·35

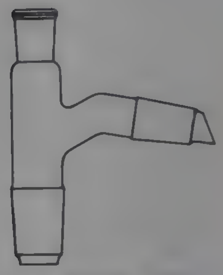


Q-SH 2/22

RECOVERY HEADS

With 14/23 thermometer socket (except Q-SH 4/0, which has 10/19 and Q-SH 4/2 which has 19/26).

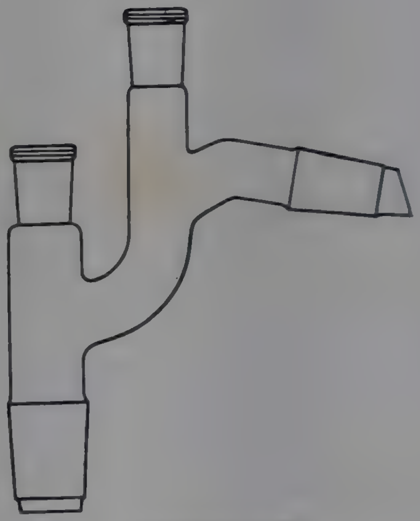
List No.	Flask cone	Condenser cone	Ten	Each
Quickfit			£	£
Q-SH 4/0	10/19	10/19	10·00	1·10
Q-SH 4/1	14/23	14/23	10·00	1·10
Q-SH 4/2	19/26	19/26	12·50	1·40
Q-SH 4/22	19/26	19/26	10·00	1·10
Q-SH 4/23	24/29	19/26	10·50	1·16
Q-SH 4/24	29/32	19/26	10·00	1·10
Q-SH 4/25	34/35	19/26	13·00	1·45
Q-SH 4/33	24/29	24/29	11·00	1·25
Q-SH 4/35	34/35	24/29	14·50	1·60
Q-SH 4/55	34/35	34/35	18·50	2·05
Clearfit, with 14/23 socket (except Q-KSH 4/2 and Q-KSH 4/4 which have 19/26 and 29/32 respectively.)				
Q-KSH 4/1	14/23	14/23	13·00	1·45
Q-KSH 4/22	19/26	19/26	13·50	1·50
Q-KSH 4/2	19/26	19/26	15·00	1·65
Q-KSH 4/33	24/29	24/29	14·00	1·55
Q-KSH 4/4	29/32	29/32	17·50	1·95



Q-KSH 4/22

CLAISEN STILLHEADS, sloping.

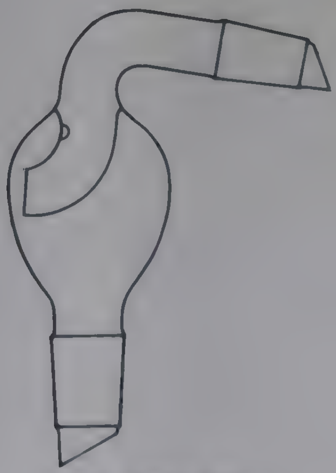
List No.	Flask cone	Condenser cone	Sockets	Ten	Each
Quickfit				£	£
Q-SH 6/1	14/23	14/23	14/23	16·50	1·85
Q-SH 6/22	19/26	19/26	14/23	16·00	1·80
Q-SH 6/23	24/29	19/26	14/23	16·50	1·85
Q-SH 6/25	34/35	19/26	14/23	19·00	2·10
Q-SH 6/33	24/29	24/29	14/23	19·50	2·15
Clearfit					
Q-KSH 6/1	14/23	14/23	14/23	18·50	2·05
Q-KSH 6/22	19/26	19/26	14/23	18·50	2·05
Q-KSH 6/33	24/29	24/29	14/23	21·50	2·40



Q-KSH 6/22

SPLASH HEADS, pear shape, sloping.

List No.	Cone fitting flask or column	Cone fitting condenser	Ten	Each
Quickfit			£	£
Q-SH 7/02	19/26	19/26	19·50	2·15
Q-SH 7/03	24/29	19/26	19·00	2·10
Q-SH 7/05	34/35	19/26	22·00	2·45
Clearfit				
Q-KSH 7/02	19/26	19/26	21·50	2·40
Q-KSH 7/43	24/29	24/29	23·00	2·55
Q-KSH 7/0/44	29/32	29/32	25·00	2·80

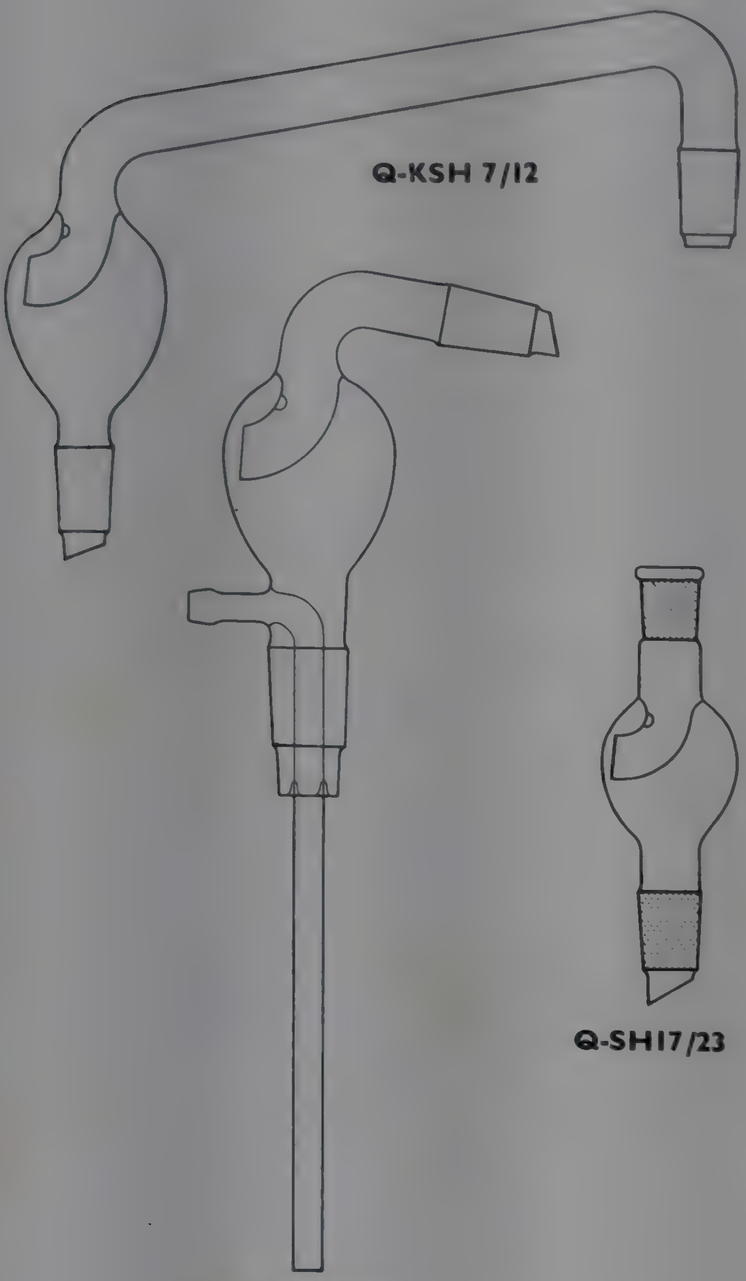


Q-KSH 7/43

All items on this page normally available from stock (code *m*).

STILLHEADS

(continued)



Q-KSH 7/12

Q-SH17/23

Q-KSH 7/63

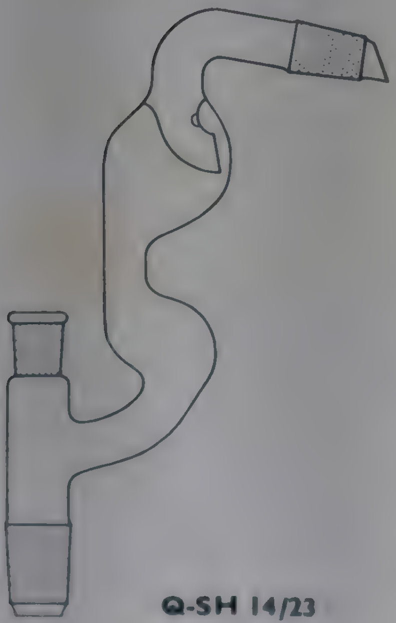
SPLASH HEADS, pear shape, vertical.

List No.	Cone fitting flask or column	Cone fitting condenser	Ten	Each
Quickfit			£	£
Q-SH 7/12	19/26	19/26	22·00	2·45
Q-SH 7/13	24/29	19/26	21·50	2·40
Q-SH 7/53	24/29	24/29	25·00	2·75
Clearfit				
Q-KSH 7/12	19/26	19/26	23·50	2·60
Q-KSH 7/53	24/29	24/29	26·50	2·95

STEAM DISTILLATION HEADS, pear shape, sloping.

List No.	Cone fitting flask or column	Cone fitting condenser	Ten	Each
Quickfit			£	£
Q-SH 7/23	24/29	19/26	24·50	2·70
Clearfit				
Q-KSH 7/63	24/29	24/29	26·50	2·95

Gallenkamp Stillheads with standard joint cones and sockets—see DT-540 et seq. in List No. sequence.



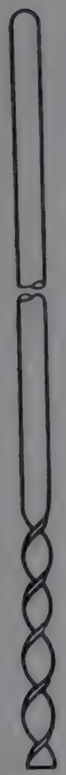
Q-SH 14/23

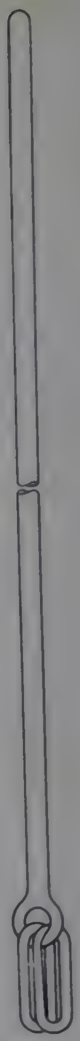
SPLASH HEADS

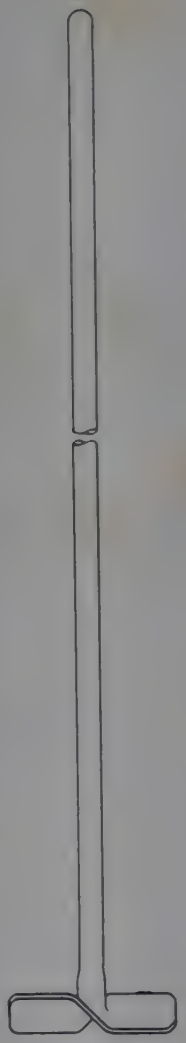
List No.	Description	Cone fitting flask or column	Cone fitting condenser	Ten	Each
Quickfit					
Q-SH 14/23	Splash head, double bulb, sloping, with 14/23 socket ...	24/29	19/26	£ 36·00	£ 4·00
Q-SH 17/23	Splash head adapter	Socket 19/26	Cone 24/29	17·50	1·95

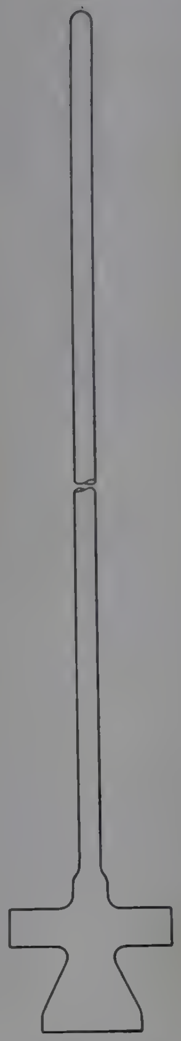
All items on this page normally available from stock (code *m*).

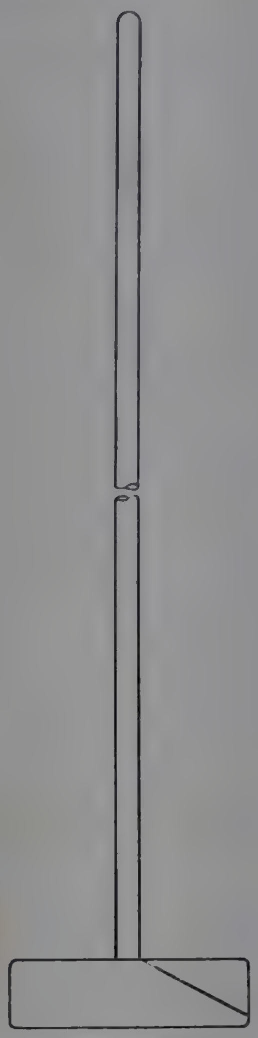
STIRRERS

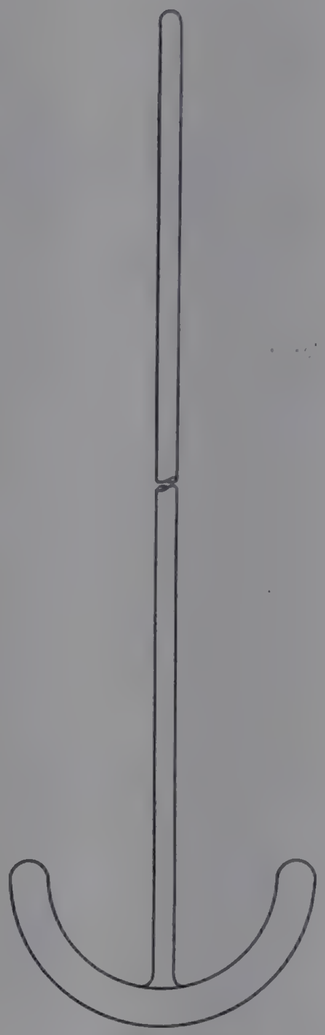

Q-ST 1/0

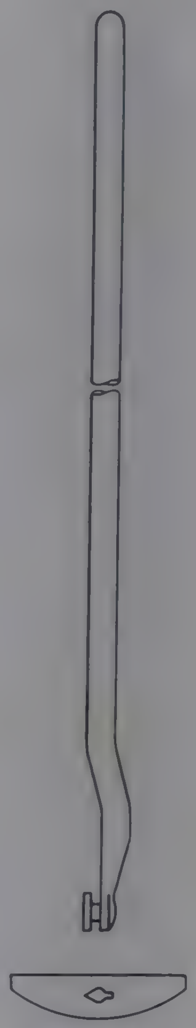

Q-ST 1/1
Q-ST 1/24


Q-ST 1/2
Q-ST 11/2


Q-ST 1/3
Q-ST 11/3


Q-ST 1/4

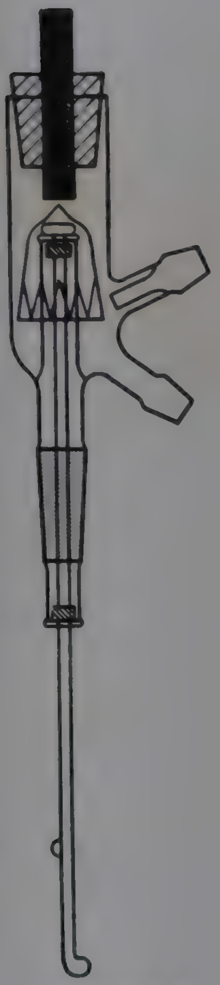

Q-ST 1/05
to
Q-ST 1/8


Q-ST 6/7
with
Q-ST 7/3

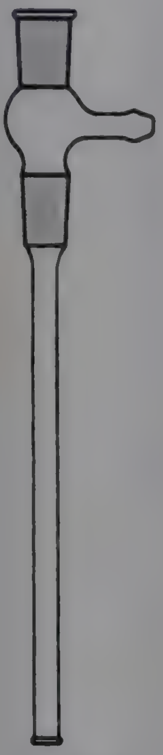
List No.	Description	Shaft		Blade dia. (extended) mm	Minimum socket to pass	Suitable for reaction vessel	Ten	Each
		Dia. mm	Length mm					
Quickfit							£	£
Q-ST 1/0	Screw type	5	210	—	10/19	—	5·50	0·62
Q-ST 1/1	Link	6	450	75	24/29	—	6·50	0·72
Q-ST 1/24	Link	6	600	75	24/29	—	7·00	0·78
Q-ST 1/4	Collapsible paddle	6	450	70	24/29	—	13·00	1·45
Q-ST 1/2	Fixed paddle	6	600	50	55/44	—	8·50	0·94
Q-ST 11/2	Fixed paddle	11	750	80	100 mm	1 – 5 l	13·50	1·50
Q-ST 1/3	Centrifugal	6	600	50	55/44	—	14·50	1·60
Q-ST 11/3	Centrifugal	11	750	92	100 mm	1 –20 l	17·50	1·95
Q-ST 1/05	Anchor	5	210	45	50 mm	50–100 ml	6·00	0·66
Q-ST 1/5	Anchor	6	450	95	100 mm	700 ml–2 l	9·50	1·06
Q-ST 1/6	Anchor	6	600	137	100 mm	2 – 5 l	9·50	1·06
Q-ST 1/8	Anchor	11	750	137	100 mm	10 –20 l	13·00	1·45
Q-ST 6/7	Shaft for Q-ST 7/2 and Q-ST 7/3	6	450	—	—	—	9·00	1·00
Q-ST 7/2	Detachable ptfe blade	—	—	52	19/26	¼ – 1 l	3·00	0·36
Q-ST 7/3	Detachable ptfe blade	—	—	76	24/29	1 – 3 l	5·50	0·62
Q-ST 11/5	Shaft for Q-ST 7/3L	11	450	—	—	—	13·50	1·50
Q-ST 7/3L	Detachable ptfe blade	—	—	76	24/29	1 – 3 l	6·50	0·72

All items on this page normally available from stock (code *m*).

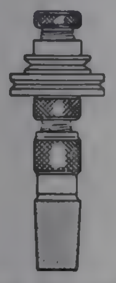
STIRRERS



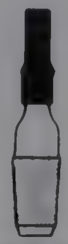
Q-MU 8/0



Q-ST 2/2



Q-ST 4/2



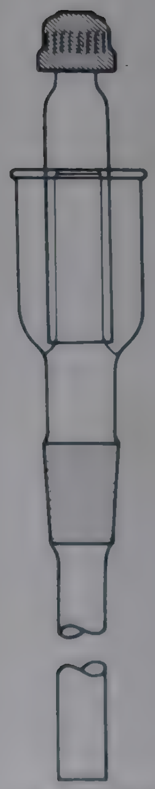
Q-ST 5/2

SEMI-MICRO STIRRER, TURBINE DRIVE, with glass shaft. The stirrer unit has a 10/19 cone suitable for fitting directly to a suitable test tube or semi-micro reaction flask. It can be driven by compressed air, water or vacuum whichever is the most convenient for the job in hand.

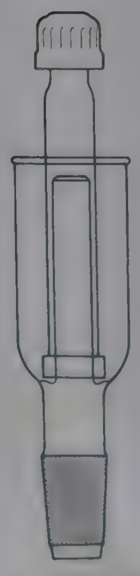
List No.	Shaft dia.	Shaft length	Ten	Each
Quickfit			£	£
Q-MU 8/0	2 mm	90 mm	54·50	6·00

STIRRER GUIDES AND GLANDS

List No.	Description	Shaft dia. mm	Cone	Ten	Each
Quickfit				£	£
Q-ST 2/2	Stirrer guide with 19/26 socket	6	19/26	12·00	1·35
Q-ST 2/33C	Stirrer guide with 24/29 socket	11	24/29	17·00	1·90
	Stirrer glands with stuffing box				
Q-ST 3/2F	Ptfe without pulley	6	19/26	42·50	4·70
Q-ST 4/2	Brass with pulley	6	19/26	37·00	4·10
Q-ST 4/2F	Ptfe with pulley	6	19/26	53·00	5·90
Q-ST 4R	O-rings for Q-ST 4/2 and Q-ST 4/2F	6	—	Pack of 10	0·40
Q-ST 4W	Felt washers for stuffing box	6	—	Pack of 10	0·20
	Stirrer glands for rubber sleeve				
Q-ST 5/1	Cone 14/23	6	14/23	6·50	0·72
Q-ST 5/2	Cone 19/26	6	19/26	6·50	0·72
Q-ST 5/3	Cone 24/29	6	24/29	6·50	0·72
	Stirrer glands with mercury seal and guide				
Q-ST 18/2	Screw cap fitting	6	19/26	19·50	2·15
Q-ST 8/2T	Spare screw cap with ring and washer	6	—	7·50	0·84
	Stirrer glands with ground sleeve				
Q-ST 20/2	Screw cap fitting, thread size 13	6	19/26	30·50	3·40
Q-ST 20/3	Screw cap fitting, thread size 24	11	24/29	41·50	4·60
Q-ST 20/4	Screw cap fitting, thread size 24	11	29/32	42·00	4·70
Q-ST 10/2T	Spare ground sleeve screw cap with ring and washer	6	—	15·00	1·65
Q-ST 10/34T	Spare ground sleeve screw cap with ring and washer	11	—	19·00	2·10
Q-ST 10P	Drive pulley for ground sleeve glands	6 and 11	—	40·00	4·40
Clearfit					
Q-KST 2/2	Stirrer guide with 19/26 socket	6	19/26	13·50	1·50
Q-KST 2/33/7	Stirrer guide with 24/29 socket	6	24/29	16·50	1·80
Q-KST 2/44/7	Stirrer guide with 29/32 socket	6	29/32	18·00	2·00
Q-KST 2/44C	Stirrer guide with 29/32 socket	11	29/32	22·50	2·50
	Stirrer glands with screw cap				
Q-KST 20/2	Thread size 13	6	19/26	31·50	3·50
Q-KST 20/3/6	Thread size 13	6	24/29	32·00	3·60
Q-KST 20/4/6	Thread size 13	6	29/32	32·00	3·60
Q-KST 20/3	Thread size 24	11	24/29	42·50	4·70
Q-KST 20/4	Thread size 24	11	29/32	43·00	4·80



Q-ST 18/2



Q-ST 20/2

All items on this page normally available from stock (code *m*).

STOPPERS AND CAPS

STOPPERS, closed ends.

List No.	Cone	Ten	Each
Quickfit		£	£
Q-SB 7	7/16	5·80	0·64
Q-SB 10	10/19	2·70	0·33
Q-SB 12	12/21	2·70	0·33
Q-SB 14	14/23	2·40	0·30
Q-SB 19	19/26	2·80	0·34
Q-SB 24	24/29	3·00	0·35
Q-SB 29	29/32	3·00	0·35
Q-SB 34	34/35	4·00	0·45
Q-SB 40	40/38	6·50	0·72
Clearfit			
Q-KSB 14	14/23	3·90	0·44
Q-KSB 19	19/26	4·50	0·50
Q-KSB 24	24/29	5·00	0·55
Q-KSB 29	29/32	5·00	0·55

STOPPERS, closed ends with hooks.

List No.	Cone	Ten	Each
Quickfit		£	£
Q-SB 14H	14/23	3·70	0·42
Q-SB 19H	19/26	4·20	0·47

Ⓐ STOPPERS

Borosilicate glass or polypropylene with standard cones—see SU-520 et seq. in List No. sequence.

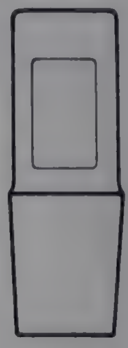
STOPPERS, long handle.

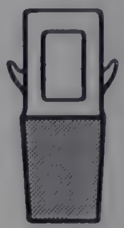
List No.	Cone	Purpose	Ten	Each
Quickfit			£	£
Q-D 62/0	10/19	Dropping funnel, bent	For price see entry on page 642	
Q-FC 16B	10/19	Dropping funnel, straight	3·70	0·42
Q-SIB 24	24/29	Iodine flask	7·00	0·78

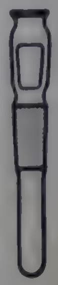
THERMOMETER POCKET

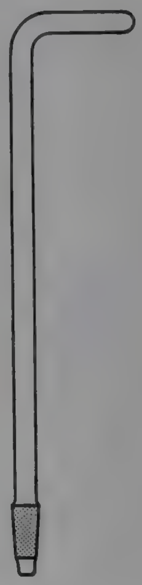
To fit all standard stillheads.

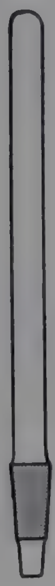
List No.	Cone	Stem length mm	Ten	Each
Quickfit			£	£
Q-SH 4A	14/23	45	6·50	0·72

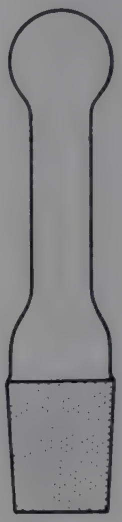

Q-KSB 19

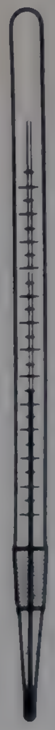

Q-SB 14H

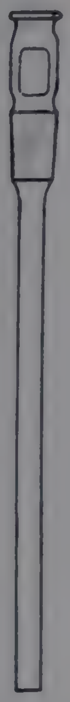

Q-SH 4A


Q-D 62/0


Q-FC 16B


Q-SIB 24


Q-MF 31/2


Q-MF 16/2

THERMOMETERS

List No.	Cone	Range	Ten	Each
Quickfit			£	£
Q-MF 31/0/110	10/19	−10 to 110°C	32·00	3·60
Q-MF 31/0/250	10/19	0 to 250°C	33·50	3·70
Q-MF 31/0/360	10/19	0 to 360°C	36·00	4·00
Q-MF 31/1	14/23	−10 to 110°C	32·00	3·60
Q-MF 31/2	14/23	0 to 250°C	33·50	3·70
Q-MF 31/3	14/23	0 to 360°C	35·00	3·90
Q-MU 31/3	—	0 to 360°C	12·00	1·35

THERMOMETER POCKETS

Long type for sealing to length required.

List No.	Cone	Stem length mm	Ten	Each
Quickfit			£	£
Q-MF 16/1	14/23	200	7·00	0·78
Q-MF 16/2	19/26	200	7·00	0·78

All items on this page normally available from stock (code *m*).

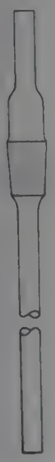
TUBES

AIR LEAK OR GAS ENTRY TUBES, straight.

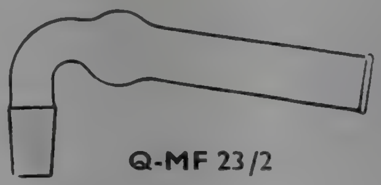
List No.	Socket	Cone	Stem length mm	Ten	Each
Quickfit				£	£
Q-MU 9/00	10/19	10/19	—	9·00	1·00
Q-MF 15/0	—	10/19	100	6·50	0·72
Q-MF 15/1	—	14/23	150	6·00	0·66
Q-MF 15/2	—	19/26	150	6·50	0·72
Q-MF 15/3	—	24/29	150	7·50	0·82

DRYING TUBES

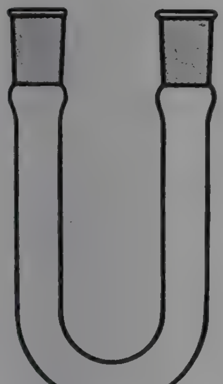
List No.	Type	Cone	Ten	Each
Quickfit			£	£
Q-MF 23/0	Angled	10/19	7·50	0·82
Q-MF 23/1	Angled	14/23	8·00	0·88
Q-MF 23/2	Angled	19/26	9·00	1·00
Q-MF 23/3	Angled	24/29	10·00	1·10
Clearfit				
Q-KMF 23/2	Angled	19/26	10·00	1·10
Q-KMF 23/3	Angled	24/29	10·50	1·16



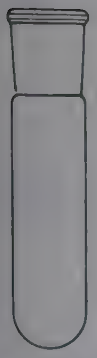
Q-MF 15/1



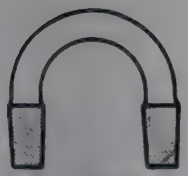
Q-MF 23/2



Q-MF 21/2



Q-KMF 24/2



Q-MF 22/2

TEST TUBES

List No.	Socket	Overall length mm	Stopper to fit	Ten	Each
Quickfit				£	£
Q-MF 24/0	10/19	65	SB 10	4·00	0·45
Q-MF 24/0/4	10/19	100	SB 10	4·00	0·45
Q-MF 24/12/4	12/21	100	SB 12	4·00	0·45
Q-MF 24/1	14/23	100	SB 14	3·50	0·41
Q-MF 24/1/5	14/23	125	SB 14	4·00	0·45
Q-MF 24/1/6	14/22	150	SB 14	4·00	0·45
Q-MF 24/2	19/26	100	SB 19	4·50	0·50
Q-MF 24/2/6	19/26	150	SB 19	4·50	0·50
Q-MF 24/3	24/29	150	SB 24	5·00	0·55
Q-MF 24/3/8	24/29	200	SB 24	5·00	0·55
Q-MF 24/5	34/35	250	SB 34	6·50	0·72
Clearfit					
Q-KMF 24/1	14/23	100	KSB 14	4·50	0·50
Q-KMF 24/1/5	14/23	125	KSB 14	5·00	0·55
Q-KMF 24/1/6	14/23	150	KSB 14	5·00	0·55
Q-KMF 24/2	19/26	100	KSB 19	5·00	0·55
Q-KMF 24/2/6	19/26	150	KSB 19	5·50	0·60
Q-KMF 24/3	24/29	150	KSB 24	5·50	0·60
Q-KMF 24/3/8	24/29	200	KSB 24	6·00	0·66

U-TUBES

List No.	Type	Socket	Cone	Ten	Each
Quickfit				£	£
Q-MF 21/2	2 Sockets	19/26	—	12·50	1·16
Q-MF 22/2	2 Cones	—	19/26	7·50	0·82

Test tubes with standard joint sockets—see TF-410 et seq. in List No. sequence.

DOUBLE SPRING CLIPS, chromium plated steel double ended clips of which one end fits the normal ½ in (13 mm) retort or scaffold rod. The other end takes glassware of sizes as shown.

List No.	To hold tube size mm	Ten	Each
Quickfit		£	£
Q-MF 40/13/10	9–12	1·60	0·23
Q-MF 40/13/19	18–22	1·60	0·23
Q-MF 40/13/24	24–28	1·60	0·23

All items on this page normally available from stock (code *m*).

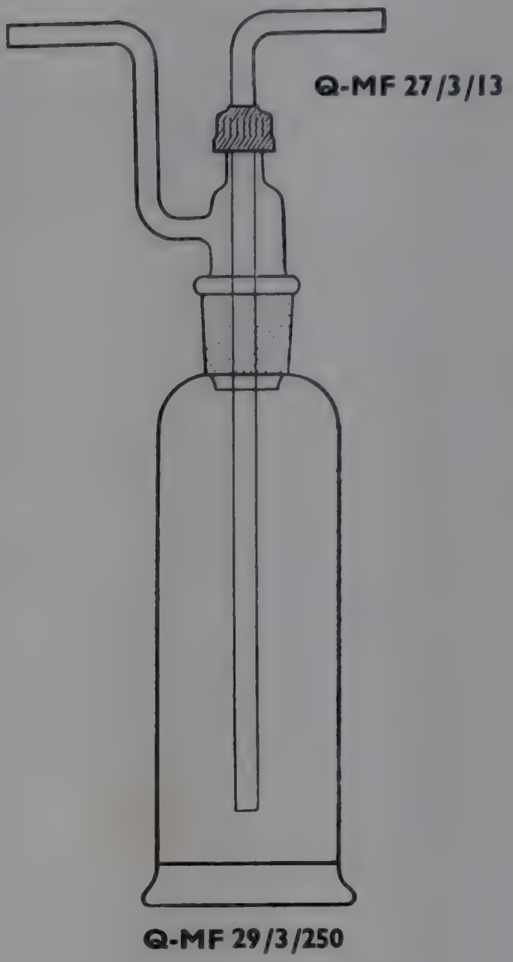
WASHBOTTLES

WASH BOTTLE HEADS for use with standard flasks.

List No.	Cone	For flasks	Ten	Each
Quickfit			£	£
Q-MF 25/3	24/29	FE 500/3	**11·00**	**1·20**
Q-MF 25/3L	24/29	FF IL/3M	**11·00**	**1·20**

WASH BOTTLE HEAD, DRECHSEL, adjustable.
A screw thread joint allows easy adjustment of the dip tube so that the head can be used with various sizes of Drechsel bottle. The dip tube is replaceable.

List No.	To fit bottles	Cone	Thread	Ten	Each
Quickfit				£	£
Q-MF 27/3/13	Q-MF 29/3/125 Q-MF 29/3/250	24/29	13	**16·50**	**1·80**

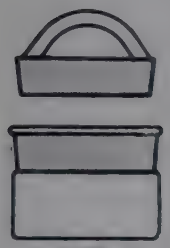


GAS WASH BOTTLES, DRECHSEL

List No.	Description	For use with	Cone	Ten	Each
Quickfit				£	£
Q-MF 28/2	Head	—	19/26	**12·00**	**1·35**
Q-MF 28/3/125	Head	MF 29/3/125	24/29	**11·00**	**1·20**
Q-MF 28/3/250	Head	MF 29/3/250	24/29	**12·50**	**1·40**
Q-MF 28/3/500	Head	MF 29/3/500	24/29	**11·50**	**1·30**
Q-MF 29/3/125	Bottle 125 ml	MF 28/3/125	24/29	**10·00**	**1·10**
Q-MF 29/3/250	Bottle 250 ml	MF 28/3/250	24/29	**11·00**	**1·20**
Q-MF 29/3/500	Bottle 500 ml	MF 28/3/500	24/29	**14·00**	**1·55**

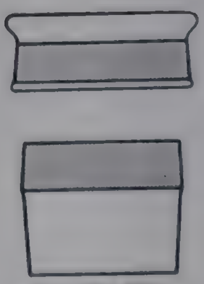
(AG) Drechsel bottles with plain or sintered distributor tubes see GAS WASHBOTTLES

Q-WB 10
Q-WB 11


Q-WB 40
Q-WB 43

WEIGHING AND DROPPING BOTTLES

List No.	Description	Socket	Cone	Maximum weight	Ten	Each
Quickfit					£	£
Q-WB 10	Weighing bottle lid	—	24/10	5 g	5·00	0·55
Q-WB 11	Weighing bottle base	24/10	—	15 ,,	6·00	0·66
Q-WB 40	Weighing bottle lid	—	40/13	10 ,,	6·00	0·66
Q-WB 43	Weighing bottle base	40/13	—	20 ,,	6·50	0·72
Q-WB 50L	Weighing bottle lid	50/14	—	25 ,,	8·00	0·88
Q-WB 50B	Weighing bottle base	—	50/14	30 ,,	7·00	0·78
				Capacity		
Q-MF 33A	Dropping bottle	—	19/17	25 ml	8·50	0·94
Q-MF 33B	Pipette	19/17	—	—	11·00	1·20
Q-MF 33C	Rubber teat	—	—	—	Pack of 10	0·30


Q-WB 50L
Q-WB-50B

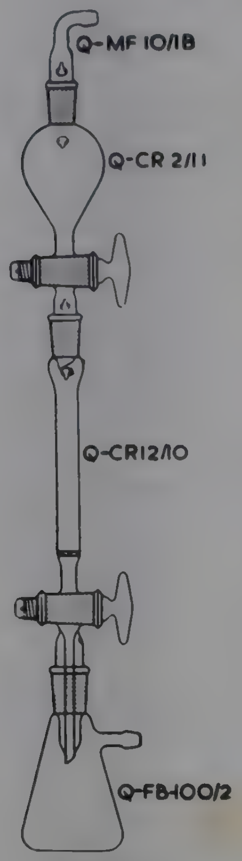
Q-MF 33A/B/C

All items on this page normally available from stock (code *m*).

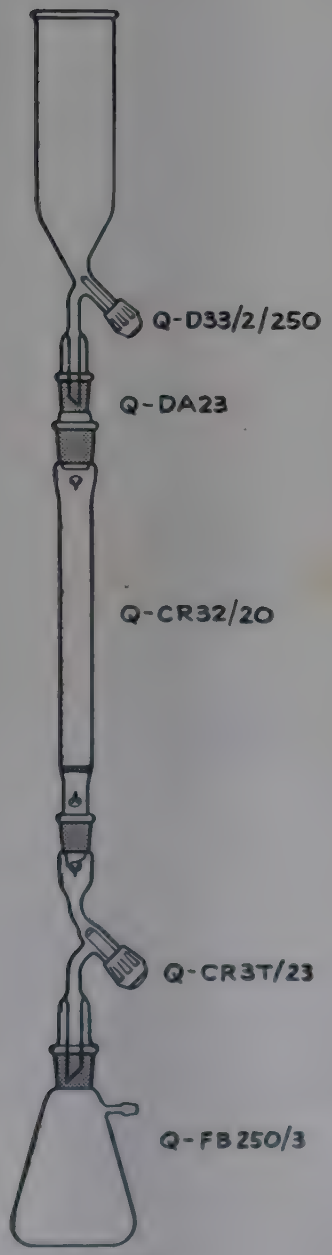
QUICKFIT ASSEMBLIES

CHROMATOGRAPHY

The *Quickfit* range of chromatographic adsorption apparatus includes semi-micro columns, and laboratory preparation columns in varying lengths. The adsorption material is supported on a sintered glass disk, porosity 0. Fittings are provided for use of the columns under vacuum or positive pressure, and suitable solvent reservoirs may conveniently be fitted by means of which it is possible to run the column under positive pressure for a considerable time without refilling.



Q-1CR
(Also includes Q-CR 41/42 and 4 × JR-140, MF 40A)



Q-2CR
(Also includes Q-CR 43/53)

List No.	Description	Socket	Cone	Five	Each
				£	£
Q-1 CR	**Assembly**	—	—	61·50	13·20
Q-2 CR	**Assembly**	—	—	64·75	14·00
				Ten	
	Components				
Q-CR 12/10	Semi-micro column with tap, 10 cm effective length, 10 mm bore	14/23	19/26	57·50	6·40
Q-CR 12/30	Ditto, 30 cm effective length, 10 mm bore ...	14/23	19/26	61·50	6·80
Q-CR 32/20	Laboratory preparation column, 20 cm effective length, 18 mm bore ...	24/29	19/26	23·50	2·60
Q-CR 32/30	Ditto, 30 cm effective length, 18 mm bore ...	24/29	19/26	24·50	2·70
Q-CR 32/40	Ditto, 40 cm effective length, 18 mm bore ...	24/29	19/26	27·50	3·10
Q-CR 2/11	Reservoir, 50 ml ...	14/23	14/23	42·00	4·70
Q-CR 41/42	Tamping rod for Q-CR 12/10 and Q-CR 12/30	—	—	4·00	0·45
Q-CR 43/53	Tamping rod for Q-CR 32/20, 30 and 40	—	—	7·00	0·78
Q-D33/2/250	Reservoir, 250 ml ...	—	19/26	42·00	4·70
					Page
Q-CR 3T/23	Tap adapter	19/26	24/29	For prices see entries on pages stated	626
Q-DA 23	Reduction adapter ...	19/26	24/29		619
Q-FB 100/2	Buchner flask, 100 ml	19/26	—		638
Q-FB 250/3	,, ,, 250 ml	24/29	—		638
Q-FB 500/3	,, ,, 500 ml	24/29	—		638
Q-FB 1L/3	,, ,, 1 litre	24/29	—		638
Q-MF 10/1B	Cone adapter... ...	—	14/23		626
JR-140	Spring, 38 mm, MF 40A	—	—		415
JR-140	,, 50 mm, MF 40B	—	—		415

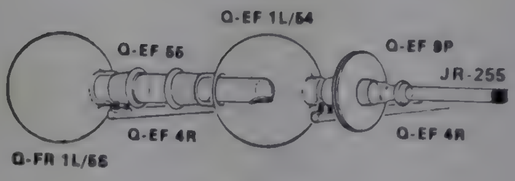
Chromatography columns and other chromatographic apparatus see CHROMATOGRAPHY.

All items on this page normally available from stock (code *m*).

QUICKFIT ASSEMBLIES

ROTARY FILM EVAPORATOR

List No.	Description	Socket/ Cup	Cone/ Ball	Ten	Each
Quickfit				£	£
Q-ILVE	**Assembly**	—	—	**86·00**	**9·60**
	Components				
Q-EF 55	Double cone adapter	—	34/35	**20·50**	**2·30**
Q-EF IL/54	Receiver flask, 1 litre ...	34/35	24/29, S 19	**32·00**	**3·60**
Q-EF 9P	Pulley wheel	—	—	**7·50**	**0·84**
Q-EF 4R	2 × Rollers ...	—	—	**9·50**	**1·04**
					Page
Q-FR IL/5S	Boiling flask, 1 litre ...	34/35	—	For prices see entries on pages stated	632
JR-255	Vacuum tube	FS19	—		415



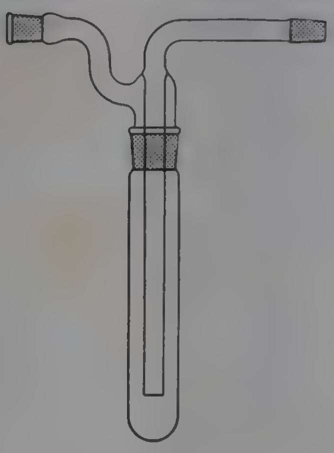
Q-ILVE

COLD TRAP

For vacuum systems. May also be used as a Kjeldahl absorption trap.

List No.	Description	Socket	Cone	Ten	Each
Quickfit				£	£
Q-MF 24/5	Trap body 250 mm ...	34/35	—	For price see entry on page 650	
Q-MF 28/52	Trap head ...	19/26	34/35 and 19/26	**29·50**	**3·30**

Q-MF 28/52



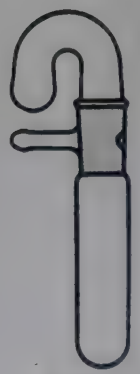
Q-MF 24/5

THUNBERG TUBES

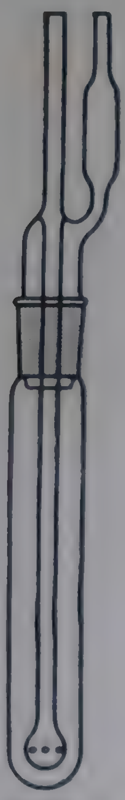
List No.	Description	Approx. capacity ml	Socket	Cone	Ten	Each
Quickfit					£	£
Q-BC 31/1	Thunberg stopper	2	—	14/23	**8·00**	**0·88**
Q-BC 32/1	Thunberg tube...	6	14/23	—	**12·00**	**1·35**
Q-BC 31	Thunberg stopper	2	—	19/26	**8·00**	**0·88**
Q-BC 32	Thunberg tube...	20	19/26	—	**12·00**	**1·35**

BLOOD UREA APPARATUS, LEURQUIN

List No.	Description	Approx. capacity ml	Socket	Cone	Ten	Each
Quickfit					£	£
Q-IIMC	**Assembly**	—	—	—	**62·00**	**6·80**
	Components					
Q-BC 11	Blood urea apparatus head	—	—	24/29	**15·00**	**1·65**
Q-MF 24/3/8	Blood urea apparatus tube	70	24/29	—	For price see entry on page 650	
JR-010	Cone (CNB 10)	See entry in List No. sequence.				
Q-MC 11P	Aeration head	—	10/19	24/29	**35·00**	**3·90**



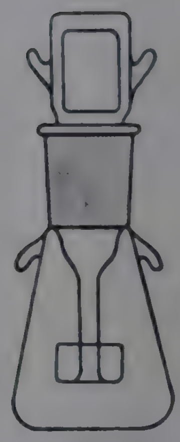
Q-BC 31
Q-BC 32



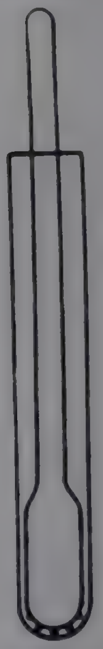
Q-BC 11
Q-MF 24/3/8

All items on this page normally available from stock (code *m*).

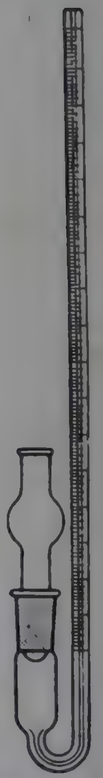
QUICKFIT ASSEMBLIES



Q-2BC



Q-BC 15P
Q-BC 15/150



Q-WE 12/1
Q-SB 14DL

CAVETT FLASK

List No.	Description	Ten	Each
Quickfit		£	£
Q-2BC	**Assembly**	**19·00**	**2·10**
	Components		
Q-BC 3CH	Special 24/29 stopper with hooks and cup	**11·00**	**1·20**
Q-BC 50/3H	Conical flask, 50 ml, 24/29 joint with hooks	**8·00**	**0·88**
JR-140	2 × Stainless steel springs, MF 40A	For price see entry in List No. sequence.	

DILATOMETER

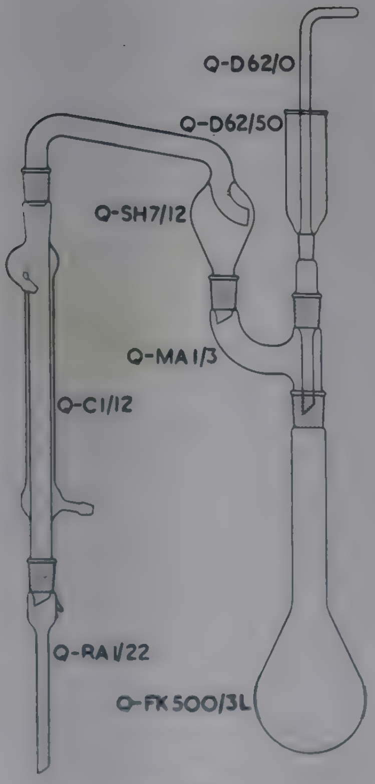
For measuring the expansion of edible oils and fats over the temperature range during which melting takes place.

List No.	Description	Joint	Ten	Each
Quickfit			£	£
Q-WE 12/1	Dilatometer body	14/23	**37·00**	**4·10**
Q-SB 14DL	Stopper portion	14/23	**5·70**	**0·62**

HOMOGENISER

This homogeniser is suitable for breaking down tissues in small scale work.

List No.	Description	Diameter mm	Ten	Each
Quickfit			£	£
Q-BC 15P	Plunger	15	**13·50**	**1·50**
Q-BC 15/150	Tube	15	**5·50**	**0·62**



Q-280MC

NITROGEN DETERMINATION

MACRO KJELDAHL DISTILLATION UNIT

This assembly uses the same flask for distillation as for the digestion stage and conversion from one stage to the other can be done very quickly. All the distillation apparatus except for the flask is carried on one straight rod by means of special spring clips, and can easily be moved into position merely by adjusting one bosshead.

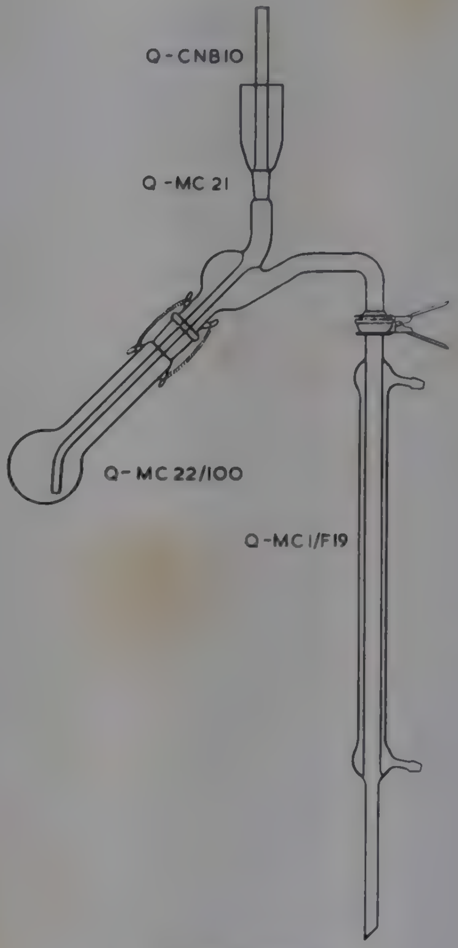
List No.	Description	Socket	Cone	Ten	Each
Quickfit				£	£
Q-280 MC	**Assembly**	—	—	**91·50**	**10·20**
	Components				Page
Q-C 1/12	Condenser, 200 mm jacket length	19/26	19/26	For prices see entries on pages stated	627
Q-D 62/50	Plug dropping funnel 50 ml	10/19	19/26		642
Q-FK 500/3L	Kjeldahl flask, 500 ml	24/29	—		637
Q-MA 1/3	Multiple adapter	19/26	24/29		620
Q-MF 40/13/24	2× Double spring clips	—	—		650
Q-D 62/0	Funnel plug	—	10/19		642
Q-RA 1/22	Delivery adapter	19/26	—		622
Q-SH 7/12	Splash head	19/26	19/26		646

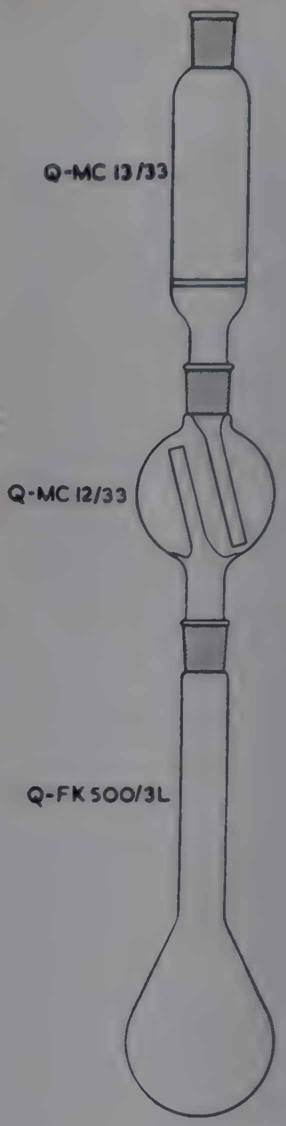
All items on this page normally available from stock (code *m*).

NITROGEN DETERMINATION

SEMI-MICRO KJELDAHL APPARATUS

List No.	Description	Socket or cup	Cone or ball	Ten	Each
Quickfit				£	£
Q-21/50 MC	**Assembly 50 ml** ...	—	—	77·00	8·60
Q-21/100 MC	**Assembly 100 ml** ...	—	—	78·00	8·60
	Components				
Q-MC 1/F19	Liebig condenser, 280 mm effective length	S19	—	19·00	2·10
Q-MC 21	Distillation head ...	10/19	19/26 and S19	44·00	4·90
Q-MC 22/50	Kjeldahl flask, 50 ml	19/26	—	8·00	0·88
Q-MC 22/100	Kjeldahl flask, 100 ml	19/26	—	8·50	0·94
JR-010	Funnel plug (CNB10)	—	10/19	For prices see entries in List No. sequence.	
JR-140	Stainless steel spring MF40A	—	—		





Q-21/100 MC

Ⓐ Kjeldahl apparatus for macro and micro determination of nitrogen see **NITROGEN DETERMINATION.**

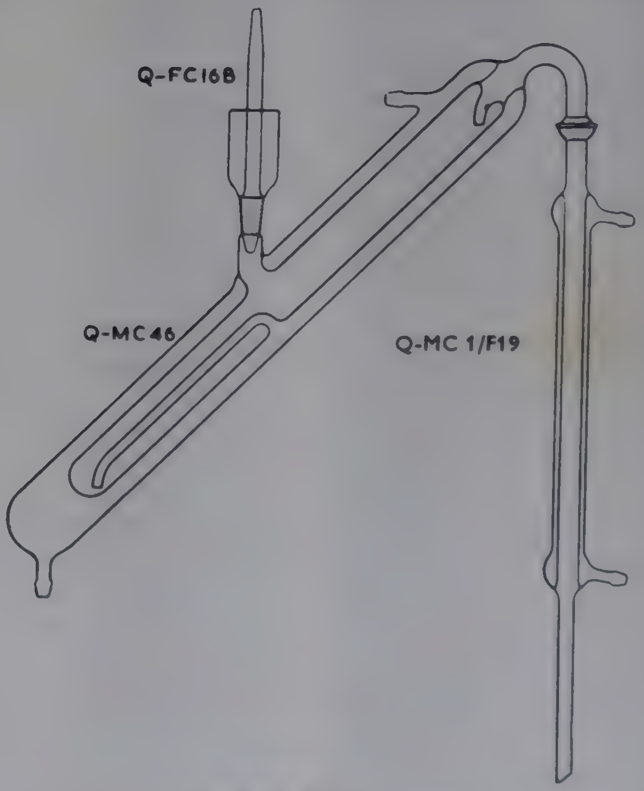
ABSORPTION TRAPS

Suitable for absorbing sulphur dioxide in Kjeldahl determinations or hydrogen chloride in Friedel-Crafts reactions without the use of a fume cupboard.

List No.	Description	Socket	Cone	Ten	Each
Quickfit				£	£
Q-MC 12/33	Lower chamber, 250 ml ...	24/29	24/29	26·00	2·90
Q-MC 13/33	Upper chamber	24/29	24/29	29·50	3·30

MARKHAM STILL, for micro-Kjeldahl determination. To BS 1428 Part B2.

List No.	Description	Socket or cup	Cone or ball	Five	Each
Quickfit				£	£
Q-46 MC	**Assembly**	—	—	60·00	12·80
	Components				
Q-FC 16B	Funnel plug	—	10/19	For price see entry on page 649.	
				Ten	
Q-MC 46	Markham still body with steam trap jacket 25 ml	10/19	S19	94·00	10·40
Q-MC 1/F19	Liebig condenser ...	S19	—	For price see entry above.	



Q-46 MC

All items on this page normally available from stock (code *m*).

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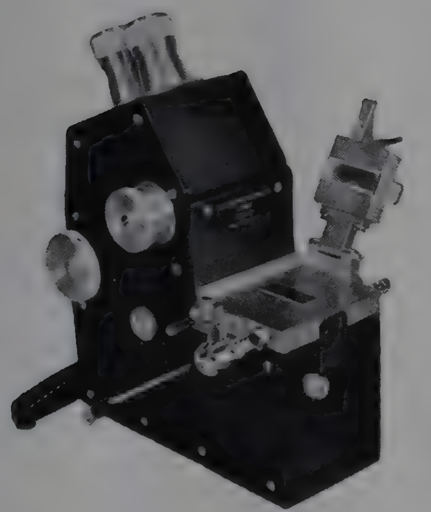
RB-820



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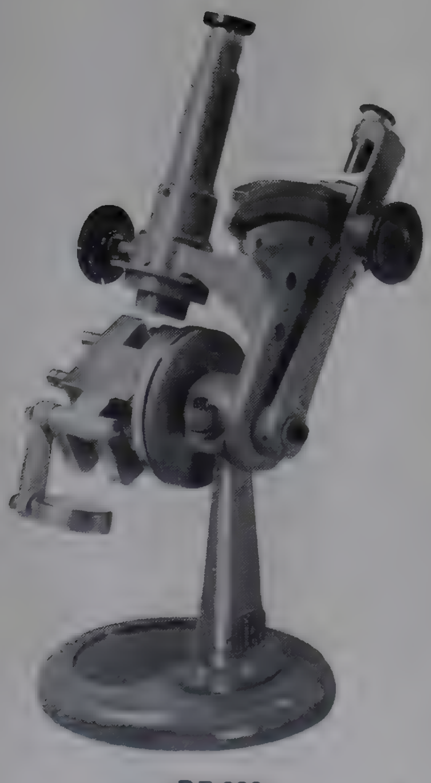


RF-080

RAIN GAUGE

RB-820

RAIN GAUGE, Symon, 5 in diameter. Comprises copper funnel with brass rim and stem, copper container and inner collecting can with lip. All exposed surfaces are bronze enamel finished. Includes 0·5 inch rainfall glass measure subdivided 0·01 in ... ... Each **£9·50** *c*

RB-840

RAIN GAUGE MEASURE, glass, for use with 5in dia. funnels. Capacity 0·5 in subdivided 0·01 in.
Each **£0·50** *c*

REFRACTOMETERS

RF-020

REFRACTOMETER, Abbé, *B & S*, for the examination of oils, fats, optical glass, sugar solutions, etc. The refractive index of substances between 1·300 and 1·700 is read directly to the third decimal place and can be estimated to 0·0002 from the totally enclosed glass scale. A sample of approximately 0·5 ml is required. Partial dispersion is obtained by calculation using the dispersion circle reading and the tables provided. With protected thermometer, horizontal measuring prism surface, for illumination by transmitted or reflected artificial light. With 4V 0·3A M.E.S. bulb and built-intransformer.
Each **£190·00** *f*

RF-025

REFRACTOMETER, Abbé, *B & S*, as RF-020 but with additional engraved glass scale for reading directly the % of soluble solids in sugar solutions and fruit pulp, etc.
Each **£200·00** *f*

REPLACEMENT PART
RF-030 **Thermometer,** scale span 0–75°C ... Each **£1·30** *f*

RF-060

REFRACTOMETER, Abbé, *B & S*, **high accuracy,** as RF-020 but with linear scale and micrometer screw enabling refractive indices to be found with an accuracy of 0·00004 using the tables provided. For use with sodium light which eliminates border line colour. With protected thermometer and horizontal prism surface.
Each **£230·00** *f*

REPLACEMENT PART
RF-030 **Thermometer.** For price see entry in List No. sequence.

ACCESSORY FOR ABBÉ REFRACTOMETER RF-060
LH-400 **Sodium lamp,** *Gallenkamp*. For details and price see entry in List No. sequence.

RF-080

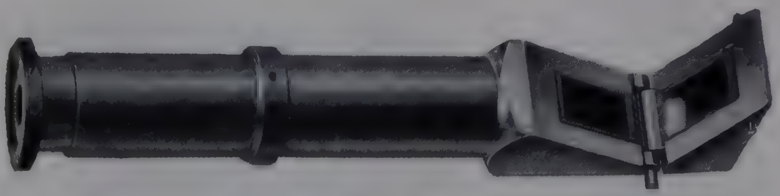
REFRACTOMETER, Abbé, *Hilger*, for rapid, routine measurement of the refractive index of liquids enclosed as a film between two water jacketed dense flint glass prisms. Refractive index range 1·3 to 1·7 with readings accurate to 0·0002 using approx. 0·5 ml. of sample. The compensator is provided with a scale from which dispersion may be calculated with the conversion tables provided. For use with transmitted or reflected artificial or natural light. In case ... ... U.K. Each **£217·00** *fN*

Items on this page normally available from stock except those coded *N*.

RF-140

REFRACTOMETERS, pocket, for soluble solids in sugar solutions. In leather case.

% range	0–50	40–85
Refractive index range	1·3330 1·4200	1·3997 1·5003
Each	**£18·25**	**22·50** *f*



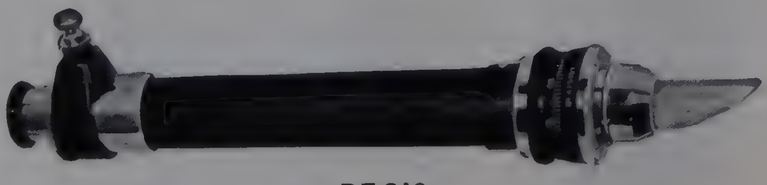
RF-140
RF-165
RF-170

RF-165

REFRACTOMETER, pocket, for determination of **protein** in solution. Scaled 0 to 16 gm/100 ml protein and 2 to 17% total solids. In leather case. Each **£22·50** *f*

RF-170

REFRACTOMETER, pocket, for determination of specific gravity and total solids content of wine solutions. Scaled 1·00 to 1·04 S.G. and 0 to 10% total solids. In leather case ... ... Each **£22·50** *f*



RF-210

RF-210

REFRACTOMETER, immersion, with prism, ocular scale and a micrometer screw with drum reading to 0·1 equivalent to 0·00004 refractive index. With metal beaker having a glass window.

Refractive index range, approx.	1·325 1·364	1·367 1·404	1·403 1·445	1·434 1·477
% sugar range	0–22	20–42	42–61	57–75

Refractive index range, approx.	1·476 1·514	1·513 1·557	1·553 1·596
% sugar range	74–88	88–100	—

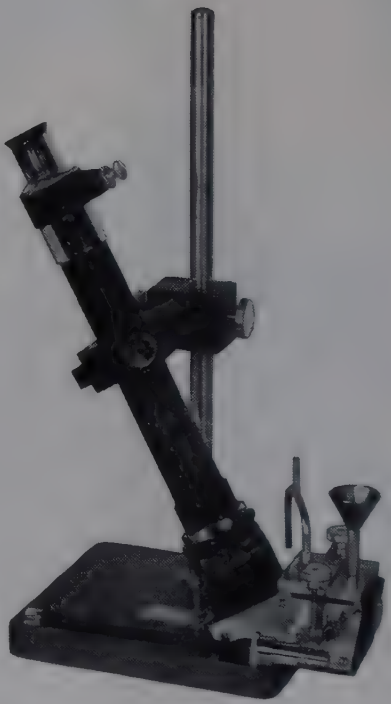
Each (all ranges) **£85·00** *fN*

When ordering please specify range required.

RF-215

REFRACTOMETER, immersion, as RF-210 but with flowthrough cell instead of beaker. As each successive sample is poured in, the previous sample is flushed out to waste. Using techniques recommended, up to 200 determinations per hour can be made on 50 ml samples. The prism and sample chamber water jackets require a source of circulated temperature controlled water. **Ranges as for RF-210** ... Each (all ranges) **£190·00** *fN*

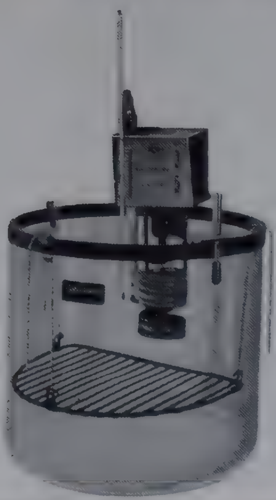
When ordering please specify range required.



RF-215

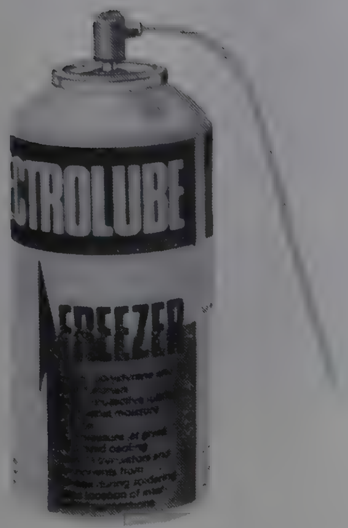
Gallenkamp THERMOSTATIC WATER CIRCULATORS

WF-360 **with** **WF-376**	Stainless steel tank. Temperature variation 0·1degC. Circulating pump accessory.
WF-850	All glass tank. Temperature variation 0·1degC. Fitted with integral circulating pump.



WF-850 with accessories

For full details and prices of above see entries in List No. sequence.



RJ-550

RJ-610

FREEZER

RJ-550

FREEZER AEROSOL, *Electrolube*, for rapidly cooling small objects and specimens down to −50°C. The spray material is non-toxic and non-inflammable and contains water repellent lubricant which first applies a thin protective film. Numerous laboratory applications include the cooling of melting point blocks and calorimeter bombs, rejoining mercury threads in thermometers, freezing of microtome knives and specimens, chilling of metallurgical samples, freezing of biological specimens for dissection, shrinking piece parts and cooling during and after soldering. In can containing 6 oz (170 g).

Each **£0·65** *mS*

CONSERVATORS

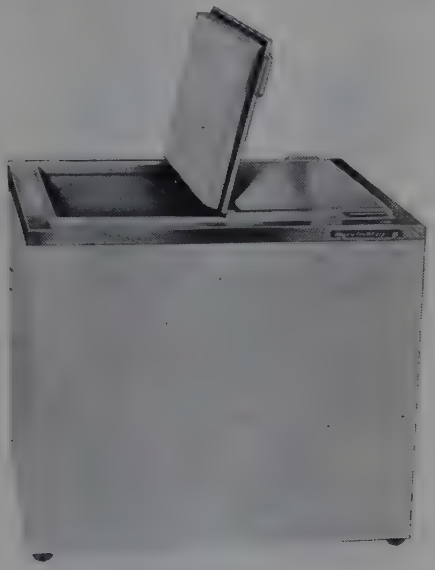
For storage of frozen materials at temperatures in the region of −20°C in ambient temperatures up to 30°C.

RJ-610

REFRIGERATOR, Conservator, *Lec*, **120 litres (4·2 ft^3) capacity,** with aluminium storage compartment and $\frac{1}{4}$ hp motor. The thermostat is adjustable over the range −23°C to −12°C.

Overall dimensions	97 × 54 × 54 cm.
Internal dimensions	64 × 43 × 43 cm.

For 200/240V 50 Hz supplies ... ... Each **£56·50** *f*



RJ-615

RJ-615

REFRIGERATOR, Conservator, *Kelvinator*, **250 litres (8·4 ft^3) capacity,** with galvanised sheet steel storage compartment and $\frac{1}{6}$ hp motor. The thermostat controls the storage temperature between −18°C and −20°C.

Overall dimensions	61 × 87 × 91 cm high.
Internal dimensions	48 × 73 × 79 cm deep.

For 210/250V 50 Hz supplies ... ... Each **£84·80** *f*

When ordering please state voltage and frequency of supply.

LOW TEMPERATURE CABINET

For operation at temperatures down to −40°C (−40°F) in ambient temperatures up to 27°C (+80°F).

RJ-640

REFRIGERATOR, low temperature cabinet, **300 litres (10 ft^3) capacity,** with enamelled sheet steel storage compartment, $\frac{1}{2}$ hp hermetically sealed compressor and hinged one-piece lid. Includes a lamp which illuminates the interior when the lid is raised and an indicating thermostat adjustable over the range 0 to −40°C.

Overall dimensions	73 × 105 × 94 cm high.
Internal dimensions	45 × 88 × 75 cm deep.

For 220/240V 50 Hz supplies ... ... Each **£278·00** *m*

When ordering please state voltage and frequency of supply.

RJ-640

REFRIGERATED INCUBATORS, *Gallenkamp*, **temperature range 0 to 45°C**—see IH-270 et seq. in List No. sequence.

REFRIGERATED WATER BATHS, *Gallenkamp*, **temperature range −20 to +50°C**—see WF-720 et seq. in List No. sequence.

Items on this page coded S normally available from stock.

GENERAL PURPOSE REFRIGERATORS

A range of front loading cabinets with magnetic door catches and hermetically sealed compressors. Suitable for use in ambient temperatures up to 43°C. Overall dimensions specified are height × width × depth.

RJ-810

REFRIGERATOR, *Lec,* **capacity 100 litres (3·8 ft^3),** shelf area 0·5 m^2 (6 ft^2). With adjustable thermostat, 2 shelves and door racks. Overall dimensions 90 × 53 × 50 cm.

For 215/240V 50 Hz supplies	Each	**£41·50** *m*
For 110/120V 60 Hz supplies	Each	**£41·50** *m*

RJ-815

REFRIGERATOR, *Lec,* **capacity 143 litres (5 ft^3),** shelf area 0·9 m^2 (8·4 ft^2). With adjustable thermostat, push button defrost, automatic interior lighting, 2 shelves and door racks. Overall dimensions 88 × 50 × 60 cm.

For 215/240V 50 Hz supplies	Each	**£45·65** *m*
For 110/120V 60 Hz supplies	Each	**£45·65** *m*

RJ-820

REFRIGERATOR, *Lec,* **capacity 185 litres (6·5 ft^3),** shelf area 1 m^2 (10 ft^2). With adjustable thermostat, push button defrost, automatic interior lighting, 3 shelves and door racks. Overall dimensions 120 × 57 × 55 cm.

For 215/240V 50 Hz supplies	Each	**£55·10** *m*
For 110/120V 60 Hz supplies	Each	**£55·10** *m*

RJ-825

REFRIGERATOR, *Lec,* **capacity 370 litres (13 ft^3),** shelf area 1·6 m^2 (17 ft^2). With adjustable thermostat, push button defrost, automatic interior lighting, 6 shelves and door racks. Overall dimensions 169 × 77 × 65 cm.

For 215/240V 50 Hz supplies	Each	**£120·00** *m*
For 110/120V 60 Hz supplies	Each	**£120·00** *m*

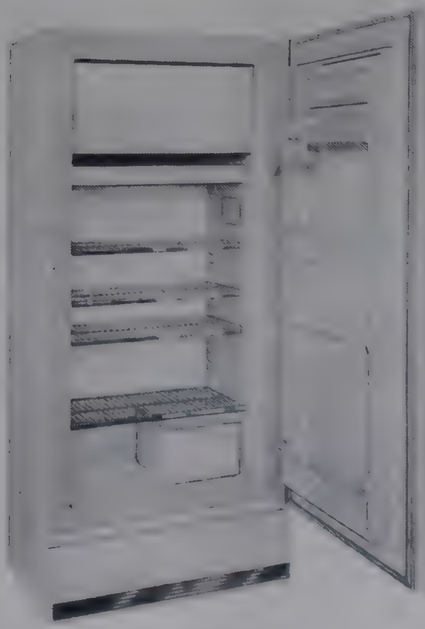
When ordering refrigerators please state voltage and frequency of supply.

Refrigerators for under bench fixing see FU-995 and FU-998 in List No. sequence.

ICE MAKING MACHINES see IC-255 to IC-282 in List No. sequence.

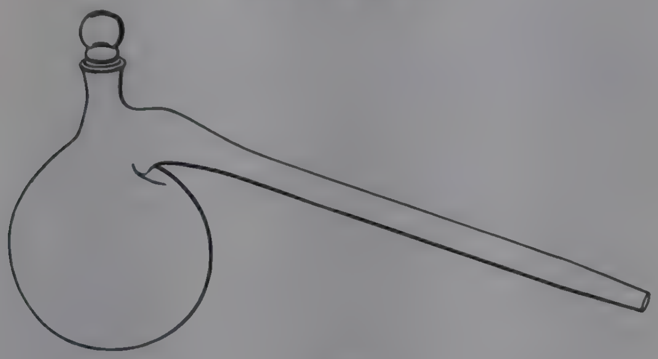
RJ-810
RJ 815

RJ-820



RJ-825

RETORTS



RP-020

RP-020

RETORTS, *Pyrex brand* glass, handmade, **with stopper.**

Nominal capacity	100	250	500 ml	
Std. pack. qty.	4	12	4	
Std. pack	**£4·50**	**15·95**	**6·10**	*d*
Each	**£1·20**	**1·50**	**1·65**	

ROD

NOTE: All glass rod prices apply to rod in standard lengths. Rod may be cut to shorter lengths at extra cost depending on size, finish required, wastage and length tolerance. Quotations on receipt of details.

EXPORT OF ROD

Unless we are instructed to the contrary orders for less than the pack quantity may be supplied with the rod cut into nominal 75 cm lengths to avoid excessive packing and freight charges.

For a summary of the properties of soda-lime and borosilicate glasses see data under page heading TUBING.

RT-020

ROD, soda-lime glass, best quality free from lead. In standard lengths of 150 cm approx. The figures in pack qty. column indicate the average number of 150 cm lengths in a pack of approx. 5 kg.

Diameter						
Nominal mm	Tolerance ±mm	Pack qty. approx.	Per Pack	Per 12 Lengths	Per Length	
			£	£	£	
3·5	0·5	120	**2·50**	**0·31**	**0·13**	*c*
4·5	0·5	87	**2·15**	**0·35**	**0·13**	*c*
5·5	0·5	53	**2·05**	**0·50**	**0·13**	*c*
6·5	0·5	40	**2·20**	**0·65**	**0·13**	*c*
7·5	0·5	29	**1·75**	—	**0·14**	*c*
9	1	19	**1·75**	—	**0·17**	*c*
11	1	14	**1·75**	—	**0·20**	*c*

Stand for glass rod—see FV-244 in List No. sequence.

RT-030

ROD, *Pyrex brand* **borosilicate glass,** in standard lengths of 150 cm approx. The figures in std. pack qty. column indicate the number of 150 cm lengths in a standard pack.

Diameter						
Nominal mm	Tolerance ±mm	Std. pack qty.	Per Std. pack	Per 12 Lengths	Per Length	
			£	£	£	
3·5	0·4	245	**13·15**	**0·74**	**0·14**	*d*
4·5	0·4	145	**12·35**	**1·14**	**0·17**	*d*
5·5	0·4	155	**10·95**	**0·96**	**0·16**	*d*
7	0·8	95	**10·50**	**1·45**	**0·20**	*d*
9	0·8	55	**10·15**	**2·40**	**0·27**	*d*
11	0·8	35	**6·45**	—	**0·27**	*d*
13	0·8	25	**6·45**	—	**0·33**	*d*

RT-080

ROD, PTFE, natural colour.

Dia. approx.	6	12	19	25 mm	
Per 30 cm	**£0·30**	**0·80**	**1·60**	**2·80**	*c*

PP-792 **Rod, polythene.** For details and price see entry in List No. sequence.

STIRRING RODS

RT-200

RODS, STIRRING, soda-lime glass, 20 cm long, 6–7 mm dia. with fused ends.

100	**£2·10**	10	**£0·27**	Each	**£0·13**	*a*

RUBBER POLICEMEN for stirring rods—see RV-180 in List No. sequence.

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

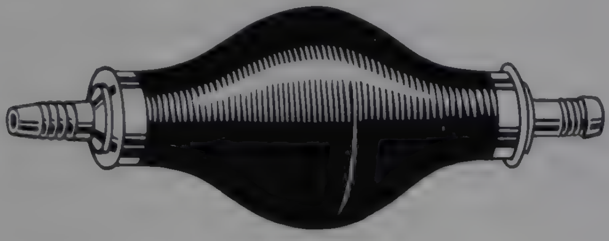
This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

RV-010

RUBBER BANDS, natural rubber, width 6 mm, in boxes of approximately 150.

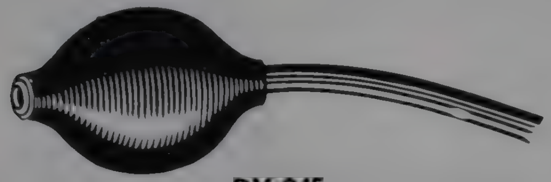
Length	50	75 mm	
10 boxes	**£3·60**	**5·10**	c
Box	**£0·42**	**0·64**	



RV-030

RV-030

BELLOWS, PVC, with screwed inlet and outlet valves and nozzles for rubber tubing connection. Bulb diameter 55 mm ... ... Ten **£6·80** Each **£0·76** c

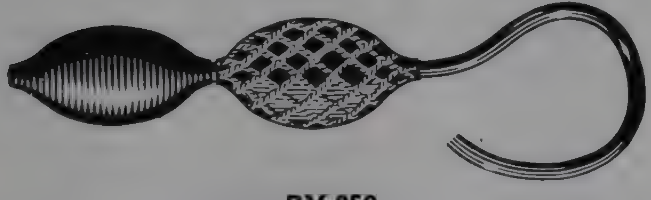


RV-045

RV-045

BLOWBALL, PVC, with inlet and outlet valves and short length of 5 mm internal diameter rubber tubing connected to outlet. Bulb diameter 45 mm.

Ten **£2·90** Each **£0·35** c

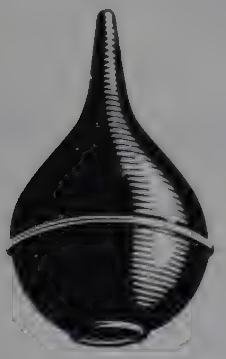


RV-050

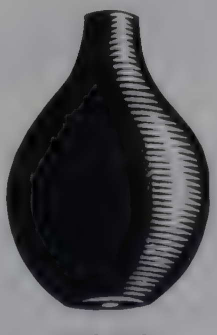
RV-050

RUBBER BLOWBALLS, with inlet and outlet valves, air reservoir protected by a net, and a short length of rubber tubing connected to outlet.

Bulb diameter	40	50	60 mm	
Reservoir diameter (inflated)	65	75	100 mm	
Ten	**£7·40**	**8·40**	**10·00**	c
Each	**£0·82**	**0·94**	**1·12**	



RV-060



RV-080

RV-060

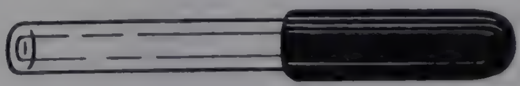
BLOWBALLS, pear shape, plasticised PVC, suitable for removing dust from balance mechanisms and from lenses of optical instruments, etc. Bulb diam. 50 mm approx.

Ten **£2·80** Each **£0·34** c

RV-080

RUBBER BULBS, pear shape, moulded rubber, for use with pipettes, etc.

Capacity approx.	7·5	15	25	40 ml	
Neck bore, approx.	4	4	4	5 mm	
Ten	**£1·90**	**2·00**	**2·10**	**2·40**	c
Each	**£0·25**	**0·26**	**0·27**	**0·31**	



RV-180 on tube

RV-180

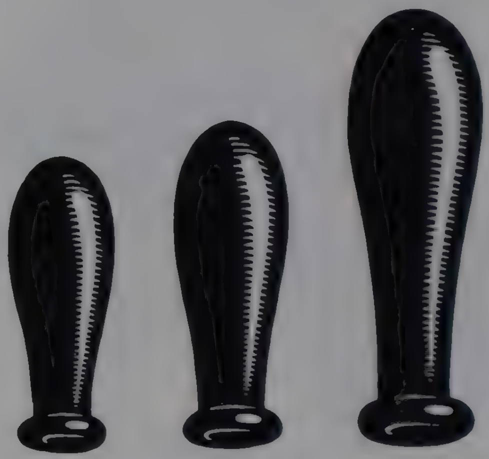
RUBBER POLICEMAN, a rubber tube, approx. 40 mm long, closed at one end for stirring rods, etc., and for temporary closures when glassblowing.

Internal diameter	3	4·5	6	8	10 mm	
Carton quantity	72	72	72	72	72	
10 cartons	**£8·80**	**10·60**	**13·00**	**14·40**	**16·00**	c
Carton	**£0·98**	**1·18**	**1·45**	**1·60**	**1·80**	

RV-181

RUBBER POLICEMAN, carton of 9 dozen **assorted** sizes of RV-180 as follows; 1 doz. each 3 mm and 10 mm, 2 doz. each 4·5 mm and 8 mm, 3 doz. 6 mm.

10 cartons **£19·50** Carton **£2·20** c



RV-220

RV-220

RUBBER TEATS, latex rubber, for dropping pipettes. The 0·8 ml capacity is suitable for use with Dreyer pipette ME-380.

Capacity approx.	0·8	1·5	2·0	2·5	4·5 ml	
Neck bore, approx.	4	4·5	5	6·5	8 mm	
Carton quantity	72	72	72	72	72	
10 cartons	**£7·20**	**8·00**	**8·80**	**9·80**	**14·60**	c
Carton	**£0·80**	**0·90**	**0·98**	**1·10**	**1·65**	

RV-221

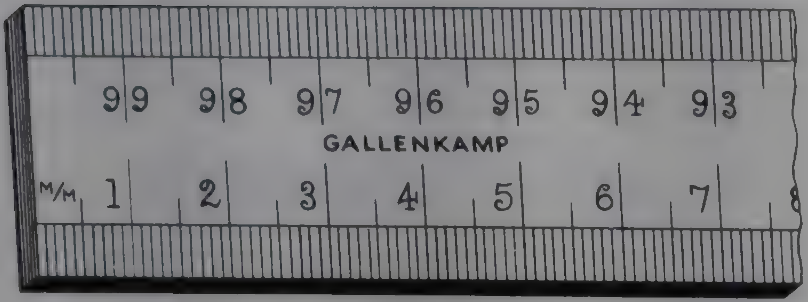
RUBBER TEATS, carton of 9 dozen **assorted** sizes of RV-220 as follows; 1 doz. each 0·8 and 4·5, 2 doz. each 1·5 and 2·5, 3 doz. 2·0 ml capacity.

10 cartons **£14·60** Carton **£1·65** c

RUBBER, adapters for Gooch crucibles	see	CRUCIBLE ACCESSORIES
RUBBER, bungs	see	STOPPERS, rubber
,, **, gloves**	see	CLOTHING, protective
,, **, tubing**	see	TUBING

All items on this page normally available from stock.

RULES


99
98
97
96
95
94
93
GALLENKAMP
M/M
1
2
3
4
5
6
7

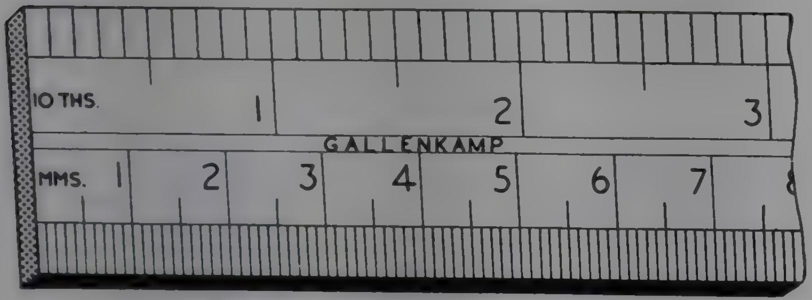
RX-021 and RX-022

RX-021

RULE, maple, horizontal reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided cm and mm on both edges ... Ten **£4·40** Each **£0·49** *c*

RX-022

RULE, as RX-021 but **boxwood** ... Each **£0·85** *m*


10 THS.
1
2
3
GALLENKAMP
MMS.
1
2
3
4
5
6
7

RX-023, RX-024 and RX-026

RX-023

RULE, maple, horizontal reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided cm and mm one edge; inch and $\frac{1}{10}$ on other edge.

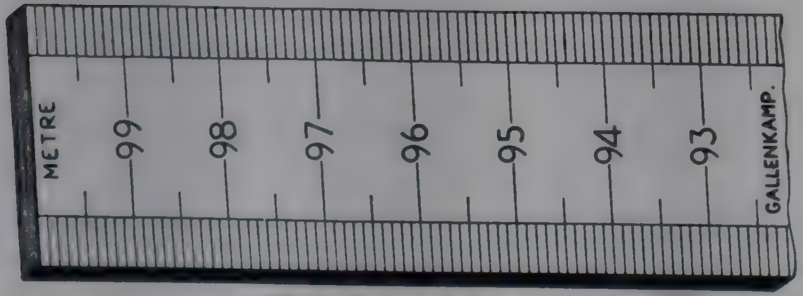
Ten **£4·40** Each **£0·49** *c*

RX-024

RULE, as RX-023 but **boxwood** ... Each **£0·70** *m*

RX-026

RULE, maple, horizontal reading as RX-023 but length 0·5 metre ... ... Ten **£3·20** Each **£0·38** *c*


METRE
99
98
97
96
95
94
93
GALLENKAMP.

RX-028 and RX-029

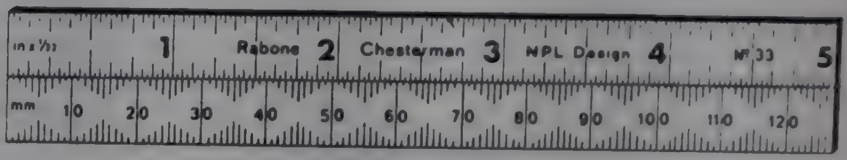
RX-028

RULE, maple, vertical reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided mm and cm on both edges ... ... Ten **£4·40** Each **£0·49** *c*

RX-029

RULE, vertical reading as RX-028 but **boxwood.**

Each **£0·70** *m*


1
Rabone 2
Chesterman 3
NPL Design 4
No 33
5
mm
10
20
30
40
50
60
70
80
90
100
110
120

RX-055

RX-055

RULE, steel, NPL design, subdivided $\frac{1}{20}$ in/mm and $\frac{1}{32}$ in/mm for measurement and conversion.

Length	5	10 in	
Each	**£0·55**	**0·93**	*m*

RABONE CHESTERMAN
INTER-FLEX RULE
315
2m.
MADE IN ENGLAND
INTERFLEX RULE
FOR INSIDE MEASUREMENT

RX-060

RX-060

RULE, spring flex, concave-convex, length 2 metres, width 12 mm, in steel case with sliding stop for inside, 'end-on' and 'hook-over' measurements. Subdivided m, cm and mm; inch, $\frac{1}{16}$ in and $\frac{1}{32}$ in for first two inches.

Each **£0·53** *m*

RX-105

RX-105

TAPE, measuring, length 30 metres (100 ft), plastics finished linen stabilised by interwoven metallic threads. Tape width 17 mm. Subdivided one side m, dm and cm; other side ft, in and $\frac{1}{4}$ in. In leather case with folding handle for reeling in ... ... Each **£4·18** *m*

SLIDE RULES see CALCULATORS.

All items on this page normally available from stock.

SAMPLE DIVIDERS

For dividing powdered or granular materials into two or more portions of similar particle size distribution to that of the bulk sample.

GRAVITY OPERATED

SA-590

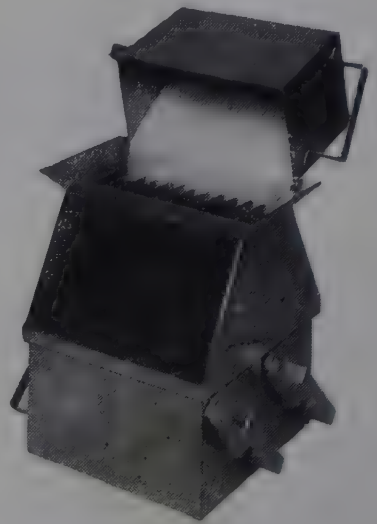
SAMPLE DIVIDER, riffle pattern, stainless steel, based on the design recommendations of **BS 812 'Methods for sampling and testing of mineral aggregates sands and fillers', BS 1377 'Methods of testing soils for civil engineering purposes' and BS 1796 'Methods for the use of BS fine mesh test sieves'.** With twelve ¼ in apertures and three sample collecting containers, each container having a capacity of approximately 300 ml ... ... Each **£22·50** *m*

SA-592

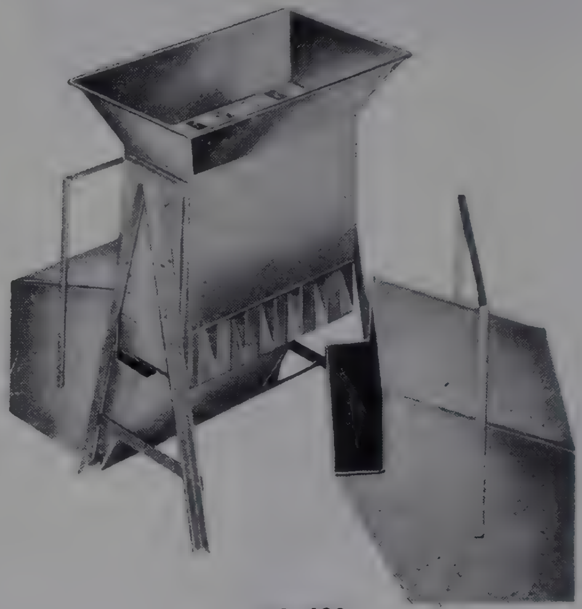
SAMPLE DIVIDER, as SA-590 but with twelve ½ in apertures and three sample collecting containers, each container having a capacity of approximately 1500 ml. Each **£24·50** *m*

SA-600

SAMPLE DIVIDER, riffle pattern, tinned steel, to **BS 1017 Part 1 'The sampling of coal' Fig. 13.** With twelve 1 in apertures and three sample collecting containers, each container having a capacity of approximately 10 litres ... ... Each **£50·00** *m*



SA-592



SA-600

SAMPLE CRUSHERS AND GRINDERS

Full details of these will be found under page heading MILLS.

SIEVES AND SHAKING MACHINES

Full details of these will be found under page headings SIEVES and SHAKERS.

BRITISH STANDARDS

The British Standards Institution is the national standardising body of the U.K. The standards which it publishes represent the results of collaboration between a wide range of interests including users, technical and scientific experts and manufacturers.

The BSI maintains close contact with many overseas standardising bodies both by interchange of information and by direct representation through the medium of ISO (International Organisation for Standardisation). Most British Standards prepared or revised in recent years reflect the influence of international requirements.

Any article made to a British Standard is one on which the purchaser or user can rely as being satisfactory for its intended general use. The BS requirements must be such as will satisfy the majority of users and manufacturers, otherwise the standard will not receive general recognition.

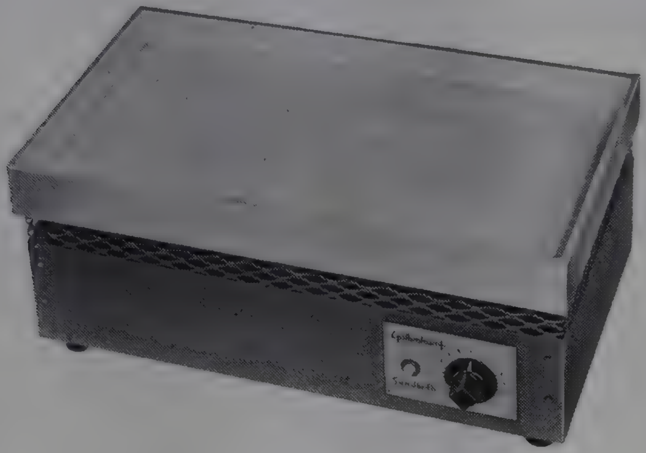
The discerning purchaser will not only require goods made to the appropriate BS but will also recognise that within the framework of a standard a variation of finish and quality is possible and that it is still as important as ever to purchase from a source with a known reputation for high quality.

The name *Gallenkamp* has been known in laboratories throughout the world for more than three quarters of a century. *Gallenkamp* products bearing one of the five registered trade marks, *Gallenkamp*, *Technico*, *Compenstat*, Ⓖ or *Asda* can be relied upon to provide the highest quality at an economic price.

All items on this page normally available from stock.

Gallenkamp ELECTRICALLY HEATED SAND BATH, 325°C

- **Working area 47×27 cm**
- **Temperature controlled by energy regulator**
- **Efficient insulation to protect bench top**
- **Even heating without the presence of fluids**



SA-855

An electrically heated sand bath for heating glassware containers and small objects where even heat is required but the use of a fluid bath containing water or oil is undesirable. The bath is of cast iron, hot process aluminium sprayed to resist corrosion. It is mounted on a robust steel base which is efficiently insulated to prevent overheating the bench top. Heating is by a sheathed 2 kW element controlled by an energy regulator with an arbitrary scale of 100 divisions. Maximum effective sand temperature is about 325°C. Bath dimensions 47×27×2·5 cm deep.

SA-855

SAND BATH, *Gallenkamp*, electrically heated, as specification, with energy regulator and load indicator lamp. For 220/240V a.c. single phase supplies.
Each **£40·00** *b*

REPLACEMENT PART

HL-056 **Heating element.** For price see entry in List No. sequence.

When ordering please state voltage and frequency of supply.

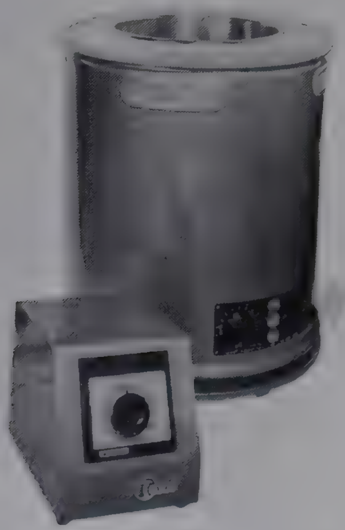
FLUIDISED SAND BATHS, 350°C

British Patent No. 732,101

Fluidised sand baths have the advantages of ease of access, rapid and uniform heat transfer, freedom from loss by evaporation and absence of fire risk.

They can be used for heating glass apparatus and for testing at elevated temperatures. Heating is uniform regardless of the shape of the vessel.

The baths have a porous plate in the base through which clean, oil free air is blown at low pressure. Such a bath of fluidised particles behaves as a bath filled with an insulating, non-volatile liquid. It is not however possible to obtain such a close temperature control as in a true liquid because the effective specific heat of the fluidised solid is much lower than that of a liquid. On the other hand this small thermal capacity gives a rapid heat up from ambient temperature.



SA-904

Both models listed below have the following features:—

- Insulated stainless steel inner vessel.
- Air flow adjustment valve.
- Safety device to switch off the heater in the event of an air supply failure.
- Maximum temperature approximately 350°C.

Both models require up to 85 litres/min of air at 0·2 kgf/cm^2 pressure.

SA-900

FLUIDISED SAND BATH, *Tecam*, **manual temperature control,** with inner vessel 17 cm diameter and 11·5 cm working depth, fitted with a 750W immersion heater. Heating time to 350°C approximately 1¾ hr. For 200/250V 50 Hz supplies. Complete with 4·5 kg charge of sand ... ... Each **£75·00** *f*

SA-904

FLUIDISED SAND BATH, *Tecam*, **thermostatically controlled,** with inner vessel 21 cm diameter and 14 cm working depth, fitted with two 1000W immersion heaters. Heating time to 350°C approximately 30 min. Temperature control is by means of a thermocouple situated just above the heaters and an external pyrometer controller, range 0–600°C. Accuracy of control is within 1% of the operating temperature. For 200/250V 50 Hz supplies. Complete with a 9 kg charge of sand ... Each **£170·00** *fN*

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

SAND BATHS

SA-920

SAND BATHS, tinned iron, with flat bottom and deep sloping sides. May also be used for oil baths.

Diameter	15	20	25 cm	
Depth	38	48	60 mm	
Ten	£0·60	0·90	1·50	c
Each	£0·14	0·16	0·22	

SA-920

SCALES

SB-220

SCALES, MIRROR GLASS, vertical reading, with engraved figures and divisions. Width 30 mm.

Length	15	25	50	100 cm	
Subdivision	1	1	1	1 mm	
Ten	£11·60	13·40	21·50	36·00	c
Each	£ 1·30	1·50	2·40	4·00	

SB-250

SCALES, PAPER, vertical reading, figured on edges. Overall width 56 mm, length 100 cm, subdivided in 1 mm.
Ten **£1·30** Each **£0·20** c

SB-220

SB-250

SCISSORS

***SB-620**

SCISSORS, nickel plated steel.

Length	15 6	18 cm 7 in	
Ten	£7·60	9·40	c
Each	£0·84	1·04	

SB-622

SCISSORS, stainless steel.

Length	15 6	18 cm 7 in	
Ten	£13·00	15·00	c
Each	£ 1·45	1·65	

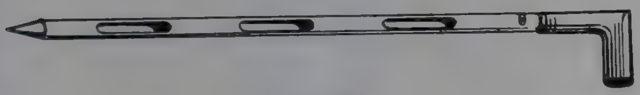
SB-620
SB-622

SCAFFOLDING	see STANDS and CLAMPS
SCALPELS **SCISSORS, dissecting**	see DISSECTING
SCOOPS	see SPATULAS
SCREWDRIVERS	see TOOLS
SEALING TAPE and TISSUE	see PLASTICS SUNDRIES
SECTION LIFTER	see DISSECTING
SEDIMENTATION balance	see PARTICLE SIZE
SEDIMENTATION tubes	see MEDICAL SCIENCES

All items on this page normally available from stock.

SEED TESTING

SC-240


SC-350

SC-352

SC-422

SC-410

IMPROVED OTTAWA SEED BLOWER

Recommended by the Official Seed Testing Station, Cambridge. For the removal of testa, husks and other lightweight material from seeds and for the differentiation between light and heavy seeds.

The seed sample rests on a wire mesh tray and is agitated and elutriated in a glass tube by an air stream at controlled low pressure. Air pressure is measured on a micro-manometer reading to 0·1 mm. Lightweight material is carried over into a Perspex chamber, open to the atmosphere, and collected on a removable tray. Overall dimensions 87 × 26 × 38 cm.

SC-240

SEED BLOWER, improved Ottawa pattern, as specification, with glass tube and Perspex chamber. For 220/240V 50 Hz single phase supplies ... Each **£117·60** *f*

When ordering please state voltage and frequency of supply.

SC-350

SAMPLING STICK, brass, with three apertures for sampling grain in sacks at different depths.

Diameter	¾	1 in	
Each	**£13·75**	**14·50**	*m*

SC-352

SAMPLING STICK, Belgian pattern, overall length 12 in ... ... Each **£3·75** *m*

DR-022

SEED FORCEPS, stainless steel, with fine points, length 11·5 cm. For price see entry in List No. sequence.

SC-410

GERMINATION BATH, Copenhagen, comprising electrically heated tinned copper water bath, with drain cock and water level indicator, mounted on a metal stand and surmounted by a gabled observation cover. The hydraulic thermostat controls the water temperature to ±0·5degC at normal germination temperatures. Using 8 to 9 cm bell jars up to 30 tests can be accommodated on glass strips which rest on the inner ledges of the water tank. Overall dimensions excluding cover 61 × 51 × 25 cm, the cover being 20 cm high falling to 10 cm. Maximum loading 200W. For 110/120 or 200/250V a.c. supplies. **Without bell jars** ... ... Each **£63 25** *f*

When ordering please state voltage and frequency of supply.

ACCESSORIES

SC-422 **Bell jar,** plastics, Copenhagen pattern, 8 cm dia. Ten **£2·20** Each **£0·28** *cS*

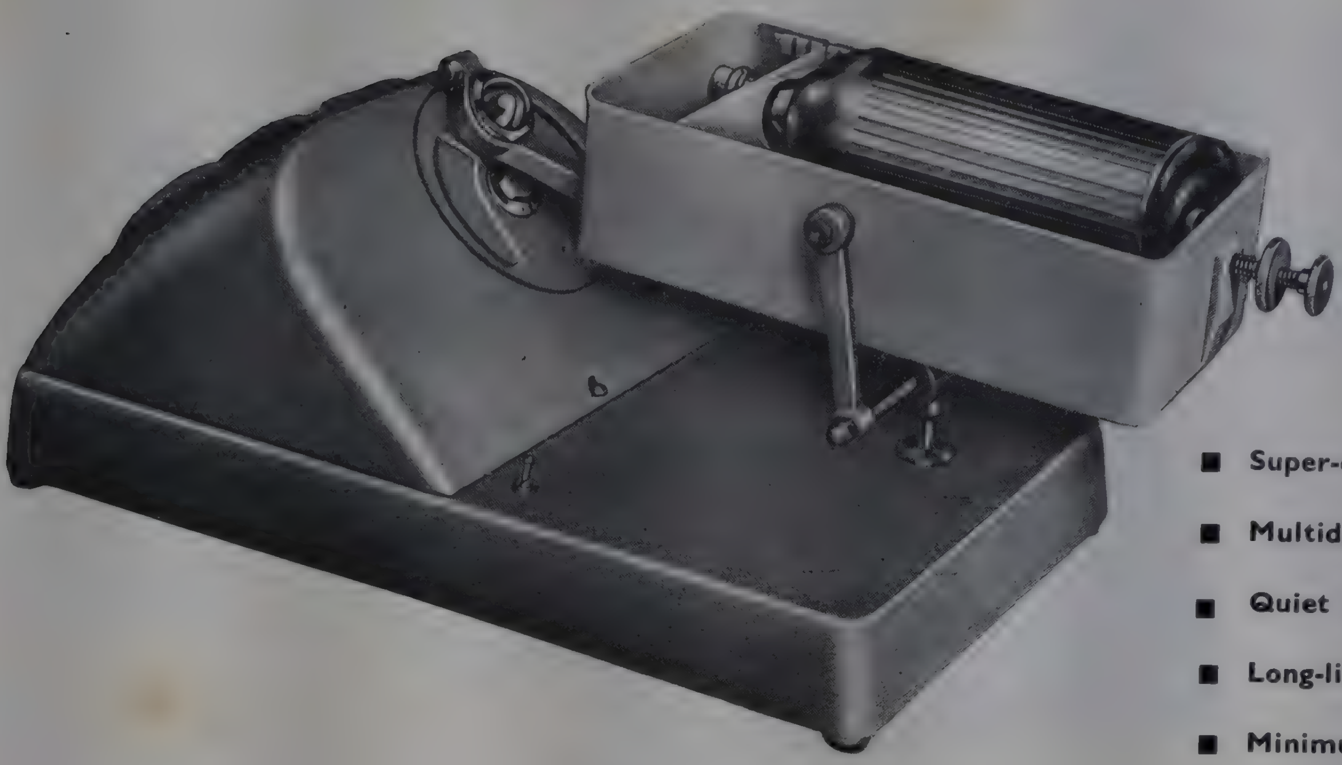
Pyrex brand **glass funnel** which may be used instead of above bell jars see FP-300 in List No. sequence

OTHER APPARATUS REQUIRED IN SEED TESTING LABORATORIES

For incubation and germination		
Gallenkamp incubators	see	IH-100 et seq.
SintAGlass filter plates	see	SF-500
Washbottles	see	WB-040 et seq.
For moisture testing		
Infrared balance	see	MV-660
For nitrogen estimations		
Kjeldahl equipment	see	NP-900 et seq.
For vernalization studies		
Refrigerator, low temperature	see	RJ-640

Items on this page coded S normally available from stock.

Gallenkamp SUPER SHAKER



SD-050

- Super-efficient shaking
- Multidirectional motion
- Quiet running
- Long-life bearings
- Minimum maintenance

The shaking action of this machine which is exceptionally vigorous and efficient is achieved by a combination of motions in three dimensions. In addition to the conventional longitudinal reciprocation, a rocking motion about a transverse horizontal axis and a rotational reciprocation about a vertical axis are applied. The machine is smooth and quiet in operation. The bottle carrier will accommodate single bottles from 125 ml to 2500 ml in the Winchester series.

CONSTRUCTION

The bottle carrier and base are constructed in an aluminium alloy. A positive, adjustable clamping device is used to hold the bottle.

SHAKING DRIVE

An arm, cast integral with the bottle carrier, is connected to an inclined crank wheel by a self aligning ball bearing. This crank wheel is driven through a vee-belt at 170 rev/min by a 1/20 hp induction motor. All bearings are grease packed ball races designed to run for long periods without attention.

DIMENSIONS

Overall	36 × 63 × 36 cm
Carrier-internal	11·5 × 38 × 18 cm
Weight	36 kg

SD-050

SHAKER, SUPER, *Gallenkamp*, as specification.

For 220/240V 50 Hz single phase supplies.	Each	**£136·00** *b*
For 200/210V 50 Hz single phase supplies.	Each	**£137·00** *bN*
For 110/120V 60 Hz single phase supplies.	Each	**£137·00** *bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

SD-052	**Driving belt**	Each	**£0·80** *b*

SPECIAL PURPOSE SHAKERS

Shaking incubators, *Gallenkamp*	see	IH-350 and IH-370
Orbital incubators, *Gallenkamp*	see	IH-400 to IH-450
Shaking table, *Gallenkamp*	see	MD-160
Warburg shaker	see	ME-800
Sieve shakers	see	SD-170 and SD-172

For details and prices of above see entries in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp FLASK SHAKER

Suitable for dissolving, dispersing, extracting and many other applications.

Gallenkamp
FLASK SHAKER

SD-110 with flasks

- **Accepts up to six 500 ml flasks**
- **Controlled speed range up to 800 oscillations per minute**
- **Seats firmly on the bench at all speeds**
- **Integral 0 to 20 minute timer with continuous run position**
- **Quiet running**
- **Robustly constructed**
- **Positive grip clamps**
- **Designed for minimum maintenance**

The flask shaker will shake loads of up to six 500 ml flasks, each about half full of liquid, at speeds up to 800 oscillations per minute.

CONSTRUCTION AND OPERATION

Comprises a diecast aluminium alloy outer case which houses the drive mechanism, an oscillating shaft fitted with six positive grip clamps, and a heavy cast iron base fitted with vibration absorbing feet to keep the shaker firmly seated on the bench or floor. The oscillating shaft runs in robust self-lubricating bearings and the oscillating action is transmitted via an eccentric and quiet-running ball bearing linkages. The minimum number of moving parts is utilised to reduce maintenance, and the shaker runs cool at all loads.

The clamps accept objects between 5 and 80 mm diameter and can be used to hold test tubes, conical and round bottom flasks, reagent bottles and beakers, etc. Shaking action is side to side in the two end positions, assisted by an up and down motion in the case of the other four positions.

Shaking speed can be adjusted between approximately 100 and 800 oscillations/minute, and the built-in 0 to 20 minute timer has a continuous run position and also an OFF position which isolates the shaker motor.

DIMENSIONS

Overall, without flasks	71 × 26 × 23 cm high
Clearance between bench and clamps	20 cm
Weight, net	15 kg

SD-110

SHAKER, *Gallenkamp*, as specification, with six clamps, speed controller and timer with continuous run and OFF positions.

For 220/240V 50/60 Hz single phase supplies.	Each	**£48·00** *b*
For 110/120V 50/60 Hz single phase supplies.	Each	**£50·00** *bN*

When ordering please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N*.

BOTTLE SHAKER

For efficient two dimensional shaking of bottles, flasks, Kahn tubes etc., using a short throw at a shaking speed of approximately 275-280 strokes/min. For two bottles up to 2500 ml capacity in the Winchester series or several bottles of smaller capacity. The carrier accepts four racks each holding 30 Kahn tubes.

SD-130

CONSTRUCTION

The carrier is a metal bound wooden box provided with two adjustable partitions one of which clamps the bottles in a vertical position. The carrier is suspended on a rigid casting to which the motor is clamped and which may be bolted on a firm support.

SHAKING DRIVE

The carrier is mounted on an underslung suspension whose bearings are sheathed with a tough resilient material. The cradle is driven from the $\frac{1}{4}$ hp motor through a vee-belt, and can be made to travel 12·5, 25 or 37·5 mm at each throw.

DIMENSIONS

Overall	30×84×33 cm
Carrier, internal	13×43×28 cm

SD-130

SHAKER, *Griffin*, as specification.

For 220/240V a.c. supplies	Each	**£79·18**	*fS*
For 100/110V a.c. supplies	Each	**£79·18**	*f*

When ordering please state voltage and frequency of supply.

ACCESSORY

SD-140	**Rack, Kahn,** with perforated rubber shelves to hold 30 tubes	Each	**£11·40**	*f*

SIEVE SHAKERS

These shakers impart a circular motion to the material being sieved so that it slowly travels round in a clockwise direction over the sieve gauze. Superimposed on this is a high speed vertical vibratory motion of very small amplitude which continually clears the sieve apertures. The combination of these two motions provides a very effective sieving action.

SD-170
SD-172

SD-170

SIEVE SHAKER, to take 8 sieves of 200 mm (8 in) dia. or 12 sieves of 150 mm (6 in) or 100 mm (4 in) dia. Complete with integral time switch, range 0 to 60 min. Overall dimensions 55×55×80 cm high. For 220/240V 50 Hz single phase supplies. **Without sieves.** Each **£84·00** *mS*

SD-172

SIEVE SHAKER, to take 6 sieves of 300 mm (12 in) dia., 12 sieves of 200 mm (8 in) or 16 sieves of 150 mm (6 in) or 100 mm (4 in) dia. Complete with integral time switch, range 0 to 60 min. Overall dimensions 55×55×80 cm high. For 220/240V 50 Hz single phase supplies. **Without sieves** ... ... Each **£90·00** *m*

For **SIEVES** see overleaf.

Items on this page coded *S* **normally available from stock.**

COMMERCIAL SIEVES

SE-100 without case

SE-100

SIEVING OUTFIT, 'Interchanger', a portable outfit comprising a polished brass body, cover and receiver with four rimmed sieving disks fitted with commercial quality woven wire gauzes of 30, 60, 90 and 120 mesh respectively. Complete in leather-cloth case with sieve brush. Dimensions, 4 in (100 mm) diameter, approx. 4 cm deep.

Set **£2·80** *m*

SE-120

SIEVES, brass wire gauze mounted in 150 mm diameter, tinned metal frame. These sieves will not nest with nominal 6 in diameter sieves.

Mesh	10	20	30	40	60	
			Each (all meshes)		**£1·50**	*m*
Mesh	80	90	100	120	200	
			Each (all meshes)		**£1·50**	*m*

ACCESSORY
SE-122 Cover and receiver set ... ... Each **£0·75** *m*

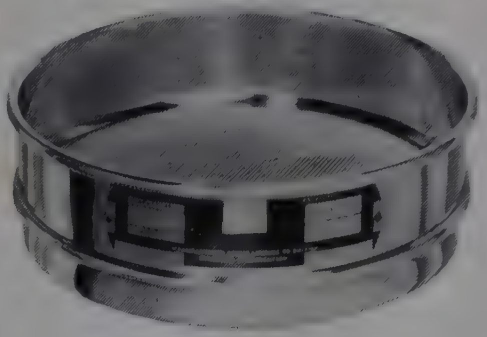
SE-130

SIEVES, as SE-120 but mounted in 200 mm diameter frame.

Mesh	10	20	30	40	60	
			Each (all meshes)		**£1·65**	*m*
Mesh	80	90	100	120	200	
			Each (all meshes)		**£1·65**	*m*

ACCESSORY
SE-132 Cover and receiver set ... ... Each **£0·90** *m*

STANDARD SIEVES



SE-140, SE-150

Sieves to BS 410 : 1969 are designated only by nominal aperture sizes. However as a guide to users the following specifications include the BS aperture figures and the **nearest equivalent** mesh numbers. Each sieve is marked with the BS nominal aperture.

SE-140

SIEVES, standard, to BS 410, brass mesh mounted in 200 mm diameter polished brass frames.

Mesh, nearest	3	4	5	6	7		
Nominal aperture	5·60	4·00	3·35	2·80	2·35 mm		
Each	**£6·00**	**6·00**	**3·30**	**3·30**	**3·30**		*m*
Mesh, nearest	8	10	12	14	16		
Nominal aperture	2·00	1·70	1·40	1·18	1·00 mm		
Each	**£3·30**	**3·30**	**3·30**	**3·30**	**3·30**		*m*
Mesh, nearest	18	22	25	30	36	44	
Nominal aperture	850	710	600	500	425	355 microns	
Each	**£3·30**	**3·30**	**3·30**	**2·80**	**2·80**	**2·80**	*m*
Mesh, nearest	52	60	72	85	100	120	
Nominal aperture	300	250	212	180	150	125 microns	
Each	**£2·80**	**2·80**	**2·80**	**2·80**	**2·80**	**2·80**	*m*
Mesh, nearest	150	170	200	240	300	350	
Nominal aperture	106	90	75	63	53	45 microns	
Each	**£2·80**	**2·80**	**2·80**	**3·40**	**3·70**	**3·80**	*m*

ACCESSORY
SE-142 Cover and receiver set, polished brass. Each **£1·80** *m*

SE-150

SIEVES, standard, to BS 410, stainless steel mesh mounted in 200 mm stainless steel frames.

Mesh, nearest	30	60	100	150	200	300	
Nominal aperture	500	250	150	106	75	53 microns	
Each	**£4·20**	**4·20**	**4·20**	**4·20**	**4·20**	**5·55**	*mN*

ACCESSORY
SE-152 Cover and receiver set, stainless steel. Each **£2·70** *mN*

SIEVING ACCESSORIES

SE-160

SIEVE BRUSH, double ended, with bristles for fine sieves and brass wire for coarse sieves.

Ten **£2·25** Each **£0·29** *m*

SE-170

SIEVE ANALYSIS GRAPH PAPER, in pad of 25 sheets 30 × 24 cm. The upper half of the sheet is used for drawing a graph of the analysis and the lower half of the sheet is ruled for tabulation of results of up to 4 analyses. Suitable for use with any standard sieve series.

Pad **£0·25** *m*

SD-170 and SD-172

SIEVE SHAKERS For details and prices see entries in List No. sequence.

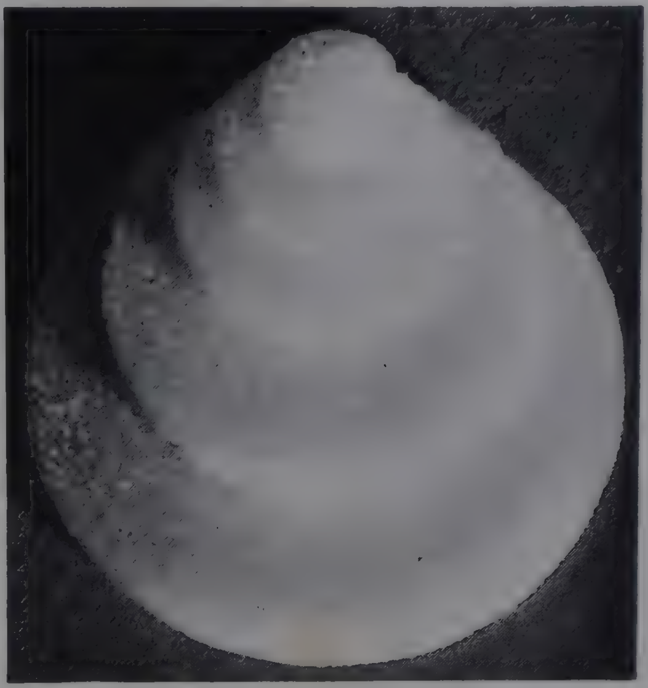
Items on this page normally available from stock except those coded *N*.

SINTAGLASS PLATES

PLATES, ***SintaGlass*****, flat,** unmounted, borosilicate glass. Suitable for filtering applications and as a convenient substratum in botanical work for growing seeds, germinating spores, etc.

Nominal dia. †	10	15	20	30	40 mm	
Porosity	**List Numbers**					
0	**SF-500**	**SF-510**	**SF-520**	**SF-530**	**SF-540**	
1	**SF-501**	**SF-511**	**SF-521**	**SF-531**	**SF-541**	
2	**SF-502**	**SF-512**	**SF-522**	**SF-532**	**SF-542**	
3	**SF-503**	**SF-513**	**SF-523**	**SF-533**	**SF-543**	
4	**SF-504**	**SF-514**	**SF-524**	**SF-534**	**SF-544**	
Ten	**£2·10**	**2·45**	**2·45**	**2·50**	**3·20**	*a*
Each	**£0·27**	**0·31**	**0·31**	**0·32**	**0·38**	

† **NOTE:** All diameters specified for sintered filter plates are nominal and may vary up to ±5%. Shrinkage during firing increases with decreasing pore size so that in general a fine porosity plate will have a smaller diameter than a coarse one of the same nominal size.



For full technical information on *SintaGlass* plates see data on pages 676 and 677.

APPARATUS INCORPORATING SINTAGLASS PLATES

will be found under the following headings.

ABSORPTION

AB-800	**Absorption tube.**

CHROMATOGRAPHY

CK-850	**Spot collector funnel.**
CL-100 **CL-130**	**Chromatography columns.**

CRUCIBLES

CW-481 to CW-515	**Filter crucibles,** Gooch, improved pattern.
CW-521 to CW-535	**Filter crucibles,** Gooch, with ground glass joint.

EXTRACTION

EV-391 to EV-413	**Extraction thimbles,** made entirely of sintered glass.
EV-421 to EV-441	**Extraction thimbles,** for use in place of paper thimbles in Soxhlet apparatus.

FILTERS

FD-350 to FD-396	**Membrane filter holder.**
FD-502 to FD-584	**Macro immersion filters, tubes and funnels.**
FD-594 to FD-654	**Micro immersion filters, funnels and beakers.**

FUNNELS

FM-601 to FM-894	**Filter funnels, cylindrical and Buchner.**
FM-923 to FM-964	**Funnels, Hirsch.**

GAS ANALYSERS

GC-176	**Gas analysis absorption vessel, Shepherd.**

GAS DISTRIBUTION

GD-800 to GD-802	**Gas distribution tubes,** with domed sintered plate.
GD-820 to GD-834	**Gas distribution tubes,** with flat sintered plate.
GD-841 to GD-853	**Gas distribution tubes,** thimble form.
GD-951 to GD-994	**Gas filter tubes (pipeline filters).**

GAS WASHBOTTLES

GF-640 to GF-702	**Gas washbottles, Drechsel,** with domed sintered distributor.
GF-740 to GF-772	**Gas washbottles, Drechsel,** with flat sintered distributor.
GF-801 to GF-821	**Gas washbottle,** with excellent absorption at very high flow rate.

MANOMETERS

MB-060	**Manometer,** Anschutz.

MERCURY

MF-880	**Mercury cleaning apparatus.**

MICROCHEMISTRY

MK-190	**Micro gas generator.**

All items on this page normally available from stock.

SINTAGLASS SINTERED GLASSWARE

TECHNICAL INFORMATION

- **Porosities controlled to well within requirements of BS 1752**
- **Fast filtering rates due to large useful plate area**
- **Non-friable sintered plates**
- **Made from borosilicate glass**
- **Porosities colour coded for easy identification**
- **Excellent uniformity of pore size**
- **All plates individually tested**
- **Robust construction**

Gallenkamp have been making high quality sintered glassware for over twenty-five years. This experience, together with the production control techniques employed, enables us to manufacture filters to closer porosity tolerances than those specified in BS 1752 'Laboratory Sintered or Fritted Filters'. In the table shown below, it will be noted that there is no possibility of overlap between adjacent ranges of maximum pore diameters with ***Sintaglass*** and therefore the performance of each porosity is significantly different from the performance of those on either side. This is an important refinement on the wider tolerances permitted by BS 1752.

POROSITIES AND APPLICATIONS

Porosity	Code colour	BS 1752 specified range of maximum pore dia.	*Sintaglass* range of maximum pore dia.	Principal uses
		µm	µm	
0	White	150 – 250	**200 – 250**	Coarse distribution of gas in liquids.
1	Yellow	90 – 150	**100 – 120**	Filtration of very coarse precipitates. Support for absorptive layers for filtering gelatinous precipitates. Gas distributors in liquids. Extraction of coarse grain material.
2	Green	40 – 90	**40 – 50**	Preparative work with crystalline precipitates. Medium gas filters. Mercury filters. Extraction of medium grain material.
3	Black	15 – 40	**20 – 30**	Preparative work with fine precipitates. Analytical work with medium precipitates. Fine gas filters. Mercury filters. Extraction of fine grain material.
4	Orange	5 – 15	**5 – 10**	Analytical work with very fine precipitates ($BaSO_4$, Cu_2O). Preparative work with finest precipitates. Safety valves for mercury.
†5	Blue	Not greater than 2	**1 – 1·8**	Bacteriological filtration.

† See Note on Bacteriological Filters on page 677.

SINTAGLASS SINTERED GLASSWARE

TECHNICAL INFORMATION

ADVANTAGES OF USE

For filtration

Not affected by reagents such as ammonia or sulphuric acid which destroy filter paper.

Tedious preparation of asbestos filter beds eliminated.

Reproducible analytical results assured due to close tolerance control of porosity in manufacture.

Constant weight quickly attained by drying at 110°C.

Easily cleaned for re-use.

Filtration process visible all the time.

For gas absorption and washing

Resistant to wet, corrosive gases.

Low back pressure on gas line, particularly when using coarse porosity disks.

High velocity with relatively low pressure.

Cleans the gas stream of suspended material as well as dispersing the gas.

DRYING AND IGNITION

Sintered crucibles are specially suitable for precipitates which have to be dried to constant weight at 110°C. They can be used with boiling liquids and placed directly in a drying oven up to 150°C, then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down again to at least 200°C before removal from the furnace. When using filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filters to crack them.

SIZE OF PLATES

All diameters specified for sintered filter plates are nominal and may vary up to ±5%. Shrinkage during firing increases with decreasing pore size so that in general a fine porosity plate will have a smaller diameter than a coarse one of the same nominal size.

GAS PRESSURE TEST

The approximate pressure necessary to pass air through plates wetted with water at 20°C.

SintaGlass Porosity	Pressure, torr
0	10
1	20
2	50
3	90
4	350
5	1800

CLEANING AND CARE OF SINTERED FILTERS

Caution

Avoid immersing the complete item of sintered glassware for prolonged periods in solutions containing either hydrochloric acid, as this may discolour the enamel of the inscription or caustic alkalis or strongly alkaline detergents which will attack the porous glass plate.

It is not good practice to immerse sintered glassware in any strong cleansing agent; it is always preferable to wash the plate through with a mild reagent and then rinse with several washes of distilled water.

Before use

Wash new filters thoroughly with hot hydrochloric acid and then with water until a neutral filtrate is obtained. This will remove any loose glass particles and accumulated dust.

After use

To ensure long and satisfactory service wash filters immediately after use, in the reverse direction from that used in filtration, and then thoroughly clean. Filters must not be connected direct to mains water pressure for backflushing. The following list of solvents will be found useful.

General cleaning	Potassium permanganate	see below
Organic substances	Potassium permanganate	
Fat	Carbon tetrachloride	
Albumen	Warm ammonia or hydrochloric acid	
Cupric oxide	Hydrochloric acid (hot) with potassium chlorate	
Barium sulphate	Sulphuric acid conc. (hot)	
Mercury residues	Aqua regia (hot)	
Silver chloride	Ammonia	

Finally rinse the filters well with distilled water, dry, and store in a dust-free place.

Use of potassium permanganate

Potassium permanganate is a satisfactory reagent for removing organic (and many inorganic) deposits; it cleans efficiently without damaging the filter.

Treat the plate with a 1% aqueous solution of potassium permanganate followed by a few drops of concentrated sulphuric acid. The resulting heat of reaction enhances the oxidising power of the mixture.

Then wash and dry the filter and remove any stain from precipitated manganese dioxide by treatment with acidified 20 vol. hydrogen peroxide. A final rinse with distilled water normally leaves the plate chemically clean.

NOTE ON BACTERIOLOGICAL FILTERS, POROSITY 5

Pore Size

Filter plates of porosity 5 will retain bacteria of sizes greater than 1·8 micron, but owing to the size range of different organisms it is impossible for us to guarantee these filters bacteriologically.

Filtration Rate

To provide the fastest rate of filtration the very fine porosity 5 plate is made very thin and is supported by a layer of porosity 3. This construction is to be understood throughout our catalogue whenever reference is made to porosity 5.

Certification

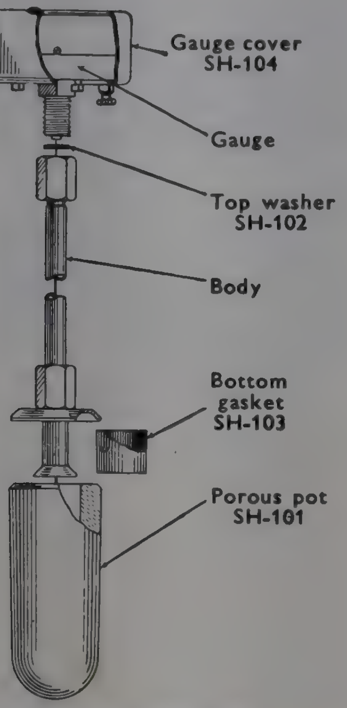
Each filter of porosity 5 is supplied complete with a test certificate showing the maximum pore size and permeability as determined by methods described in BS 1752 'Laboratory Sintered or Fritted Filters'.

Gallenkamp SOIL MOISTURE TENSIOMETERS

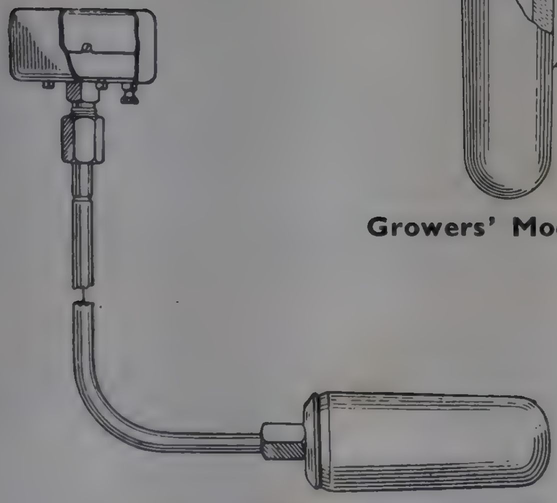
For the determination of the force which a root must overcome in order to draw water from soil.

Widely used by commercial growers, horticultural and agricultural research stations.

- **Continuous reading of soil moisture tension**
- **Independent of electrical properties of the soil**
- **Suitable for soil depths between 7·5 cm and 60 cm**



Growers' Model SH-080



Bench Model SH-085

PRINCIPLE

The reading on the gauge, calibrated in cm Hg, indicates the moisture tension of the soil. This reading is directly related to the effort plants must exert against surface force action to extract water from the soil. Tensions so measured are directly comparable and any particular tension indicates the same degree of water availability. Consequently, the calibration of the tensiometer readings against soil moisture content is unnecessary. The moisture tension in soil varies with the moisture content, the soil particle size and the packing of the soil. In any given position, the last two factors tend to remain constant so that variations in soil moisture tension reflect the changes in moisture content.

When the soil is at field capacity, that is holding all the water it can against the gravitational pull, the tension is usually about 3 to 6 cm and it will gradually rise as the soil dries. Addition of water causes a rapid reduction of tension in most soils. With tensions below 30 to 35 cm plants do not suffer generally from water shortage, but growth and yield can be substantially increased if soil is maintained near the field capacity reading. With tensions of less than 3 to 5 cm, waterlogging and deficient drainage are indicated.

SPECIFICATION

The tensiometer comprises a porous pot connected by a union and brass tube to a 6 cm vacuum gauge calibrated 0–60 cm Hg. Each tensiometer is tested at our works and is despatched filled with water, the porous pot being enclosed in a waterproof wrapping to prevent loss of water by evaporation during transit and storage. When in use the gauge is protected from chemical sprays and water by a bright red polythene cover. The tensiometers must be protected from freezing.

SH-080

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **growers' model,** as specification, for maximum depth of 30 cm. Filled with water ready for use, with cover and instructions ... ... Each **£6·30** *b*

SH-085

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **bench model,** for use in shallow benches or troughs, minimum depth 7·5 cm, as specification, but with L-shape stem. Filled with water ready for use, with cover and instructions ... ... Each **£7·25** *b*

SH-090

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **orchard model,** as specification, for maximum depth of 60 cm. Filled with water ready for use, with cover and instructions ... ... Each **£6·70** *b*

REPLACEMENT PARTS

SH-101	**Porous pot,** in waterproof cover.	Ten	**£4·80**	Each	**£0·54**	*b*
SH-102	**Top washer,** rubber.	10 packs	**£1·60**	Pack of 12	**£0·23**	*b*
SH-103	**Bottom gasket,** rubber.	Ten	**£0·50**	Each	**£0·13**	*b*
SH-104	**Protective cover,** red polythene.	Ten	**£3·20**	Each	**£0·38**	*b*

ACCESSORIES

SH-106	**Filler,** a screw capped plastics bottle with a flexible tube for topping up tensiometers.	Ten	**£1·10**	Each	**£0·18**	*b*
SH-107	**Spanner,** $\frac{1}{16}$ in. Whitworth, for unscrewing both connections of tensiometers			Each	**£0·15**	*b*
SH-108	**Soil auger,** steel, 4 cm dia., 90 cm overall length, with 12 mm dia. shaft and welded cross handle.			Each	**£4·75**	*b*

All items on this page normally available from stock.

SOIL CONDUCTIVITY

SH-120

SOIL SALTS CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC4.** A portable, transistorised, battery operated instrument for measuring the soluble salt content of soils in the range 0–100 CF (Conductivity Factor) units. CF measurements give a valuable guide to fertilization requirements, and the quantity and quality of water for effective irrigation. A beaker cell, with constant K = 1·0 and sample volume approximately 12 ml, plugs into the side of the instrument. Complete with one cell, cell cleaning brush, thermometer 0–50°C, sample settling bottle, water measuring cylinder and one *Ever Ready* Type PP4 battery.
Without carrying case ... ... Each **£36·00** *fN*

REPLACEMENT PARTS AND ACCESSORY

SH-122	**Measuring cylinder**	Each	**£0·53**	*fN*
SH-123	**Sample settling bottle**...	Each	**£0·13**	*fN*
EJ-057	**Cell,** CJ/10	For prices see entries in List No. sequence.		
EJ-058	**Thermometer,** without case ...			

SOIL TESTING OUTFIT

When certain soils are shaken with water they yield suspensions which take several hours to settle. By addition of a finely divided insoluble substance such as barium sulphate, the suspended soil particles are carried down with the settling $BaSO_4$ particles thereby leaving a clear supernatant liquid ready for pH measurement with the pH indicator included in the outfit.

SH-140

SOIL TESTING OUTFIT, *BDH*, comprising a polished wooden cabinet with twelve test tubes, 100 g $BaSO_4$, 100 ml *BDH* soil pH indicator, 500 ml distilled water, a small spatula and a pH colour chart ... Each **£4·75** *m*

REPLACEMENT PART

SH-145 **Soil pH indicator,** *BDH*, in 100 ml polythene bottle. Each **£0·30** *m*

SOIL HYDROMETERS

SH-160

HYDROMETER, soil, Road Research Laboratory pattern, to BS 1377 Test 7D, for determining particle size distribution in soils. Range 0·995 to 1·030 g/ml. Calibrated at 20°C. Overall length 345 mm.
Each **£1·20** *a*

SH-165

HYDROMETER, Bouyoucos, to ASTM D422, shot weighted, range 0 to 60 g/litre calibrated at 67°F. Overall length 28 cm ... ... Each **£1·70** *a*

SH-167

HYDROMETER JAR, Bouyoucos, with two marks at 1130 and 1205 ml, height 458 mm, diam 70 mm.
Each **£1·20** *a*

SH-120

SOIL THERMOMETER

SH-210

THERMOMETER, sheathed, soil temperature, comprising solid stem mercury thermometer fused into a stout glass tube with the bulb embedded in a layer of paraffin wax to ensure correct readings on drawing thermometer to surface. Range −5 to +40°C subdivided in 0·5degC. For use with steel tubes SH-215 driven into the soil ... ... Each **£5·50** *mN*

ACCESSORIES

SH-215 **Steel tubes,** seamless, with copper cap and length of chain for suspending thermometer SH-210 in the tube at the required depth.

For use at	30	120 cm depth	
Each	**£3·50**	**4·50**	*mN*

Gallenkamp
REGD TRADE MARK

SEDIMENTATION BALANCE

For Particle Size Analysis

- Full range 5μ to 75μ in 6 hours
- Illuminated read-out
- Operates on 0·5 g of sample
- Optional auto-recording system

For full details see PC-650 et seq. in List No. sequence.

Other apparatus for soil testing will be found under the following page headings:

Density
Mills
Moisture
Ovens
Sample Dividers
Sieves

Items on this page normally available from stock except those coded *N*.

SPATULAS, SCOOPS AND SPOONS

SJ-050, SJ-055

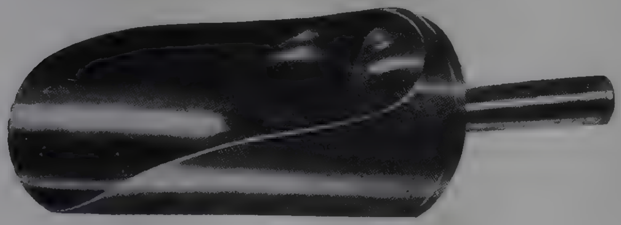
SJ-050
SCOOP, aluminium, length 10 cm, width 3 cm.
Ten **£1·50** Each **£0·22** c

SJ-055
SCOOP, stainless steel, overall length 10 cm, width 3 cm... ... ... Ten **£3·20** Each **£0·38** c

SJ-062

SJ-062
SCOOPS, rigid polythene. Strong tough scoops suitable for handling dry chemicals which do not attack polythene.

Scoop length	10	14	19 cm	
Overall length	18	24	30 cm	
Ten	**£1·90**	**4·20**	**6·80**	c
Each	**£0·26**	**0·47**	**0·76**	

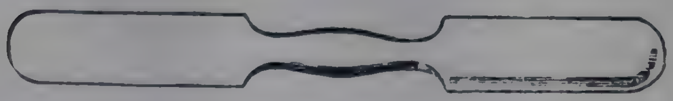


SJ-080

***SJ-080**
SCOOPS, stainless steel, cylindrical, with hollow stainless steel handle.

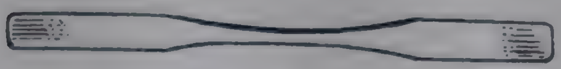
Length of base	10	15	20	23 cm	
Overall length	19	26	32	35 cm	
Each	**£0·85**	**1·05**	**1·45**	**1·75**	m

SCOOPS, glass, see **WEIGHING ACCESSORIES.**



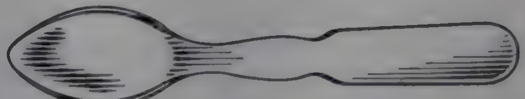
SJ-122

SJ-122
SPATULA, horn, polished and flexible with thin rounded ends, length 10 cm approximately, width 1·5 cm.
Ten **£1·90** Each **£0·26** c



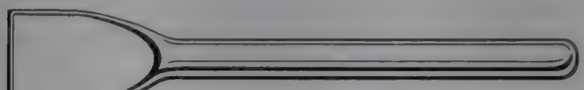
SJ-124

SJ-124
SPATULA, palette knife, horn, polished and flexible, length 15 cm approximately, width 1 cm.
Ten **£3·00** Each **£0·36** c



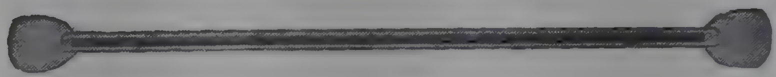
SJ-130

SJ-130
SPATULA, horn, rigid, with spoon end, length 15 cm approximately, spoon width 3 cm.
Ten **£4·80** Each **£0·54** c



SJ-150

SJ-150
SPATULA, polythene, flexible, with one blade. Length 12·5 cm approximately, blade width 1·5 cm. In pack of 10 ... ... 10 packs **£2·40** Pack **£0·31** c



SJ-155

SJ-155
SPATULA, polythene, with metal insert in handle and blade at each end. Also suitable for use as a stirrer. Length 22 cm, blade width 2 cm.
Ten **£3·00** Each **£0·36** c

SJ-180

SJ-180
SPATULAS, pure nickel, lightweight, flat with rounded ends.

Overall length	9	15 cm	
Max. width	2	3 cm	
Ten	**£1·40**	**2·70**	m
Each	**£0·21**	**0·34**	

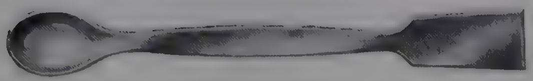
SJ-190

SJ-190
SPATULA, Nuffield pattern, stainless steel. With scoop one end and angled blade the other. Overall length 13 cm, width 1 cm.
Ten **£1·00** Each **£0·17** c

SJ-195

SJ-195
SPATULA, stainless steel. One end has a deep offset spoon which can reach any part of the common sizes of reagent bottles. The other end has a chisel type blade with one square and one rounded corner suitable for scraping adherent material or lifting single particles. A cranked channel section handle provides rigidity and convenient holding. Length 19 cm, spoon width 2 cm.
Ten **£4·80** Each **£0·54** m

All items on this page normally available from stock.

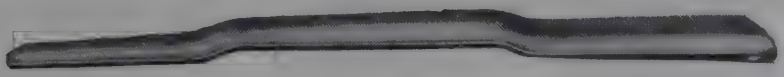


SJ-200

SJ-200

SPATULAS, stainless steel, heavyweight, with one spatulate end and one spoon end.

Overall length	15	21 cm	
Max. width	2	2 cm	
Ten	£2·50	4·00	m
Each	£0·32	0·46	



SJ-205

SJ-205

SPATULA, stainless steel, double ended, scooped, 17·5 cm long, 19 mm wide at one end and 11 mm at the other ... ... Each **£0·25** *m*

SJ-210, SJ-212

SJ-210

SPATULAS, Chattaway pattern, pure nickel.

Overall length	10	15	20 cm	
Max. width	5	8	11 mm	
Ten	£1·80	1·90	2·80	m
Each	£0·25	0·26	0·34	

SJ-212

SPATULAS, Chattaway pattern, stainless steel.

Overall length	10	15	20 cm	
Max. width	5	8	11 mm	
Ten	£1·50	1·70	2·30	m
Each	£0·22	0·24	0·29	

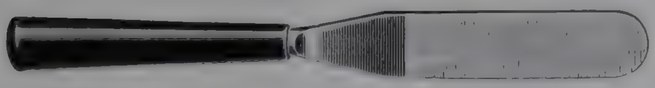
SJ-214, SJ-216

SJ-214

SPATULA, micro, Chattaway pattern, pure nickel. Overall length 15 cm, width 5 mm.
Ten **£1·90** Each **£0·26** *m*

SJ-216

SPATULA, micro, Chattaway pattern, stainless steel. Overall length 15 cm, width 5 mm.
Ten **£1·80** Each **£0·25** *m*

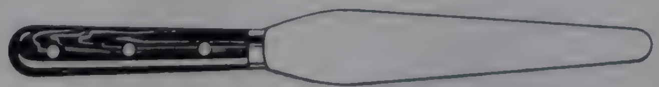


SJ-250

SJ-250

SPATULAS, palette knives, with stainless steel parallel sided, flexible blade set in wood handle.

Blade length	10	15	20	25	30 cm	
Blade width	2	3	4	4	4·5 cm	
Ten	£4·70	5·60	7·60	10·00	14·40	c
Each	£0·52	0·62	0·84	1·10	1·60	

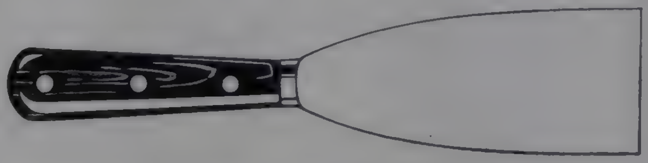


SJ-255

SJ-255

SPATULAS, palette knives, with stainless steel tapered sided, flexible blade, set in wood handle.

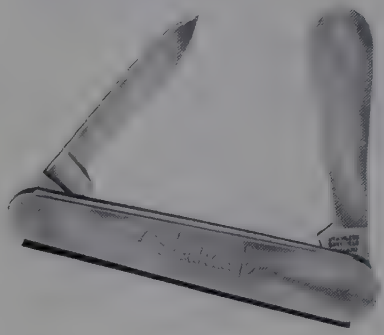
Blade length	7·5	10	15 cm	
Blade width, max.	1·5	2	3 cm	
Ten	£4·20	4·40	5·60	c
Each	£0·48	0·50	0·62	



SJ-260

SJ-260

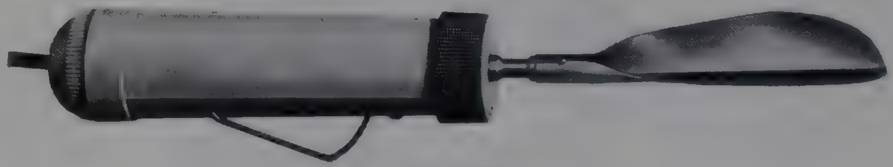
SPATULA, filling knife, with 5 cm wide carbon steel blade set in wood handle. Blade length 13 cm.
Ten **£5·80** Each **£0·64** *c*



SJ-330

SJ-330

SPATULA and pocket knife, combined, with stainless steel blades. Overall length, closed 8 cm, open 18 cm.
Ten **£12·00** Each **£1·35** *c*



SJ-402

***SJ-402**

VIBRO-SPATULA, *Mettler,* for rapidly dispensing small quantities of powdered or granular material to an accuracy of 0·1 mg. Vibration is started and stopped by depressing a button on the handle and the amplitude of vibration is varied by adjusting a milled ring. With four sizes of interchangeable, stainless steel spatula blades, including one for dispensing into narrow-necked vessels, and a cleaning brush all packed in a plastics storage tray. For 100/125V or 200/250V a.c. single phase supplies.
Each **£14·00** *m*

When ordering please state voltage and frequency of supply.

SPECIMEN bottles	see	BOTTLES
„ **boxes**	see	BOXES and BIOLOGICAL SCIENCES
„ **jars**	see	JARS
„ **tubes**	see	TUBES
SPECTACLES	see	CLOTHING, PROTECTIVE
SPECIFIC GRAVITY	see	DENSITY and HYDROMETERS

All items on this page normally available from stock.

SECTION INDEX

SPECTROMETERS Page

Student spectrometer 682
Direct reading wavelength spectrometer 682

SPECTROSCOPES

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Reading diffraction spectroscope 683
Wavelength prism spectroscope 683
Hartridge spectroscope 683

SPECTROPHOTOMETERS Page

Pye Unicam SP 90 689
Pye Unicam SP 500... 685
Pye Unicam SP 600... 684
Pye Unicam SP 800... 687
Pye Unicam SP 1200 688
Pye Unicam SP 1800 686

SPECTROMETERS

SK-020

STUDENT SPECTROMETER

A simple table spectrometer for demonstrating the more important experiments in spectroscopy. The instrument has a divided circle 15 cm diameter reading the rotation of the telescope by vernier to 1 minute. The telescope of 15 cm focal length and 20 mm aperture is fitted with an adjustable eyepiece and the collimator of 15 cm focal length and 20 mm aperture is provided with an adjustable slit fitted with a reducing wedge. The prism table of 55 mm diameter is divided on the edge for minimum deviation setting.

SK-020

SPECTROMETER, student model, *B & S*, as specification ... ... Each **£95·00** *f*

SK-050

DIRECT READING WAVELENGTH SPECTROMETER

For use in the visible spectrum, the ultraviolet and infrared. The accuracy of reading is about 1Å between 4000 Å and 5500 Å and 3 Å to 6 Å up to 8000 Å.

CHARACTERISTICS

A dense flint prism of approximately 1·76 refractive index is used and gives a high dispersion over the visible spectrum. The ultraviolet spectrum can be investigated down to 2000 Å using either a fluorescent eyepiece or a camera which also may be used for photography in the visible region. The silica prism covering bands down to 2000 Å is used also for investigations in the near infrared to 40,000 Å. For the far infrared a rocksalt prism is introduced. The spectrometer may be used with sodium or mercury discharge lamps.

SK-050

SPECTROMETER, WAVELENGTH, *B & S*, direct reading, with flint glass prism, shutter eyepiece and cross wires ... ... Each **£280·00** *f*

ACCESSORIES

SK-052	**Silica prism,** range 2000 to 40,000Å ...	Each	**£65·00**	*f*
SK-053	**Rocksalt prism,** range 7000 to 100,000Å	Each	**£60·00**	*f*
SK-054	**Divided sleeve,** to fit micrometer drum, for use with SK-052 and SK-053. Readings from calibration tables.	Each	**£17·00**	*f*
SK-056	**Divided sleeve,** to fit micrometer drum and reading directly to 2000Å using silica prism SK-052.	Each	**£17·00**	*f*
SK-057	**Fluorescent eyepiece,** to replace standard eyepiece for examination of UV spectra	Each	**£17·00**	*f*
SK-059	**Slit rods,** to carry auxiliary apparatus on spectrometer.	Pair	**£10·00**	*f*

Sodium and mercury discharge lamps see LAMPS.

SPECTROSCOPES

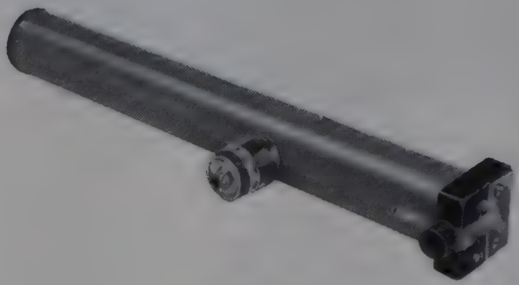
SK-100

SPECTROSCOPE, POCKET DIFFRACTION, *Ealing*, for students and general purposes, having a dispersion of 11°. The slit is of fixed width, protected by a glass cover to prevent dust from entering. With adjustable eyepiece for focusing the spectrum accurately. With case ... ... Each **£9·00** *f*

SK-100

SK-104

SPECTROSCOPE, READING DIFFRACTION, *Ealing*, for medical research, analytical work and for general purposes in a physical laboratory. The dispersion is 34° and the slit is provided with an adjustment. A drum graduated in 100 arbitrary divisions by which the spectrum can be moved across the field and used in conjunction with an indicator, enables readings to be taken. An adjustment is fitted for accurately focusing the spectrum. With case ... ... Each **£55·00** *f*


SK-104

SK-130

SPECTROSCOPE, WAVELENGTH, PRISM, *Ealing*, for taking readings in wavelengths and having a dispersion of 10°. Scale reading is viewed in the same field as the spectrum, each division of the scale representing 100 Å. An adjustable slit and a control for focusing are provided. There is an adjustment for the scale so that it can be set accurately in relation to the spectrum. With case. Each **£60·00** *f*

ACCESSORY For SK-104 and SK-130

SK-134	**Holder** for positioning a test tube in front of slit. Accepts one test tube up to 25 mm dia. ... Each **£2·60**	*f*

SK-130

HARTRIDGE REVERSION SPECTROSCOPE

For the accurate spectroscopic examination of haemoglobin.

PRINCIPLE

The reversion method in which two spectra are produced, one above the other, but with the colours reversed, ensures great accuracy in setting. By means of an adjusting screw, one spectrum moves across the other in an opposite direction, so that an absorption band or an emission line in one spectrum can be set to coincide with the same band, or line, in another spectrum.

OPERATION

The scale covers the range from 3000 to 7000 Å, each division of the micrometer drum representing 1 Å. The slit is symmetrical and the width is controlled by the rotation of a ring which is graduated in ·001 in. A cylindrical condensing lens in front of the slit concentrates the light so that the whole slit aperture is filled.

SK-200

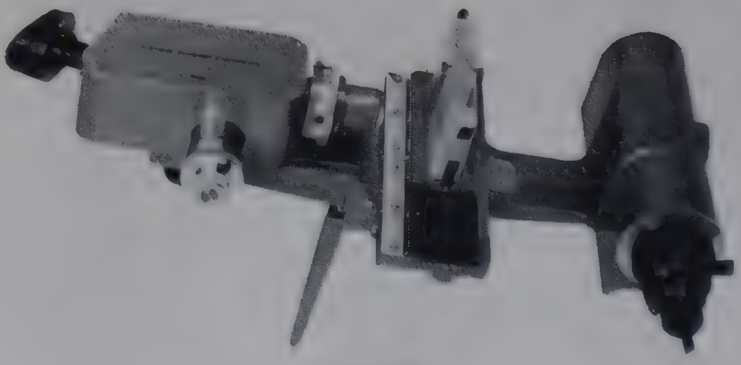
SPECTROSCOPE, Hartridge reversion, *Ealing*, as specification. Without holders, troughs, illuminating lamp or carrying case ... ... Each **£92·00** *fN*

SK-230

SPECTROSCOPE OUTFIT, Hartridge Reversion, *Ealing*, comprising:

- **Spectroscope,** SK-200.
- **Stand,** with illuminating lamp.
- **Holder,** for glass troughs.
- **Holder,** for two test tubes.
- **Holder,** for two test tubes and two boiling tubes.
- **Troughs,** fused glass, width 5 mm, pair.
- **Troughs,** fused glass, width 10 mm, pair.
- **Baffle plate,** for cutting out extraneous light.
- **Case,** to contain spectroscope and accessories.

Each **£166·50** *fN*


SK-200

Items on this page normally available from stock except those coded *N.*

SP 600 SERIES 2 SPECTROPHOTOMETER

335-1000 nm

For manually operated transmission and absorption measurements

Single beam

SL-505 without transformer

NOTE:
Prices given are for U.K. only. Export prices on application.

TECHNICAL DATA

Range	340–1000 nm (calibrated 330–1020 nm) or 335–1000 nm with accessory SL-524
Source	Prefocused tungsten filament or quartz-iodine lamp
Monochromator	Littrow type with 60° glass prism
Wavelength accuracy	±0·5 nm at 360 nm ±1·5 nm at 600 nm ±7·0 nm at 1000 nm
Photometric accuracy	±0·5%T
Photometric reproducibility	Within 0·5%T
Resolution	Better than 3 nm over most of range
Stray light	Less than 1% throughout range
Dimensions and weight	24 × 16 × 10 in 55 lb 600 × 400 × 250 mm 25 kg
Power requirements	190/260V 50 Hz single phase supplies

- **Solid, all-cast construction, unitised for easy maintenance**
- **Minimum number of controls arranged for maximum convenience**
- **Choice of null balance or recorder output**

SL-505

SPECTROPHOTOMETER, *Pye Unicam* **SP 600 Series 2,** as specification, with prefocused tungsten filament lamp covering range 340 to 1000 nm, four 10 mm fused glass cells, power supply unit SP 649 and constant voltage transformer SP 651. For 190/260V 50 Hz single phase supplies ... ... Each **£328·00** *fS*

ACCESSORIES

SL-513 **Cells, fused glass,** with lid.

Light path	1	2	5	10	20	40 mm	
Each	**£3·00**	**3·00**	**2·90**	**2·50**	**3·00**	**4·00**	*fS*

SL-514 **Microcell holder SP 680.** A self-contained four-position cell holder with lens, for use where sample volume is limited. Provides 10 mm light path with 0·45 ml sample. **Without microcells** ... ... Each **£48·50** *f*

SL-516 **Microcell,** 10 mm fused glass, with lid. Each **£2·10** *fS*

SL-518 **Microcell,** 20 mm fused glass, with lid. Each **£2·60** *f*

SL-520 **Test tube holder SP 630.** A four-position holder for ½ in. test tubes. For use (e.g. clinical) where speed is desirable but high level of accuracy not necessary. Minimum capacity per tube is 3 ml. Supplied with four laboratory grade test tubes ... ... Each **£13·10** *f*

SL-522 **Autocell SP 625,** provides a semi-automatic means of filling and emptying a special sample cell. Minimum volume required 5 ml ... ... Each **£47·00** *f*

SL-524 **Quartz-iodine lamp SP 652** on prefocus base, to extend wavelength range down to 335 nm. Each **£3·00** *f*

NOTE: SL-524 can be fitted by the user only to models manufactured after January 1967. Such models are identified by the wavelength scale being calibrated 330 to 1020 nm.

SL-556 **Recorder SP 22.** For details and price see entry in List No. sequence

SL-558 **Concentration readout unit.** For details and price see entry in List No. sequence.

Gallenkamp **COLORIMETER** for clinical and metallurgical determinations in the visible light range. See CS-200 in List No. sequence.

Items on this page coded S normally available from stock.

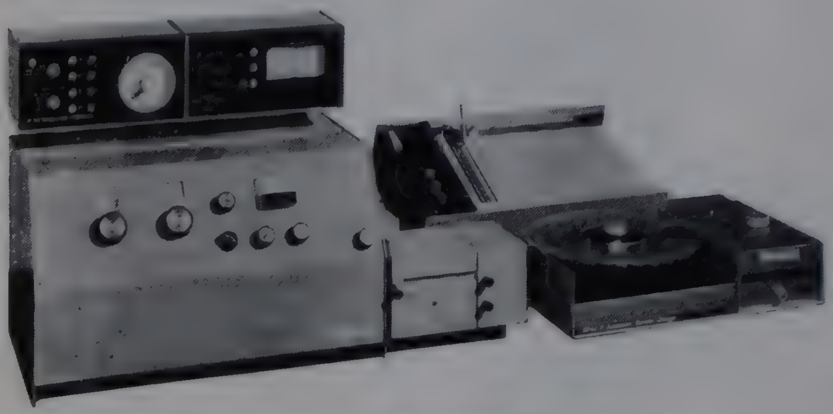
SP 500 SERIES 2 SPECTROPHOTOMETER

186-1000 nm

For high accuracy quantitative determinations with optional recording

Single beam

- **High accuracy and stability**
- **Null balance or direct readout**
- **Full range of automation accessories including recorder**



SL-530 with SL-554 and SL-556

TECHNICAL DATA

Range	186–1000 nm
Sources	Air-cooled deuterium arc and tungsten filament lamp. Automatic lamp selection by wavelength with manual override
Slits	Bilateral curved slits, continuously variable up to 2 mm
Monochromator	Littrow type with 30° high-purity silica prism
Detectors	VS39 or IRV4 (red sensitive) and QVA39 or UVV4 (blue sensitive) photocells
Wavelength accuracy	±0·2 nm at 200 nm ±1·0 nm at 400 nm ±2·5 nm at 600 nm
Photometric accuracy	±0·3%T (null-balance mode)
Photometric reproducibility	±0·1%T
Resolution	0·5 nm (200–400 nm) 1·0 nm (400–800 nm)
Stray light	Less than 0·2% at 200 nm
Electronics	Fully transistorised, printed circuit board construction
Presentation	Switch-selection of potentiometric null-balance operation or direct meter readout, calibrated in transmittance and absorbance units. Recorder output suitable for use with SL-556 or other 10 mV recorders
Dimensions	35 × 17 × 21·5 in 890 × 450 × 550 mm
Power requirements	200/250V, 50/60 Hz (250VA max) 100/120V, 50/60 Hz

SL-530

SPECTROPHOTOMETER, *Pye Unicam* **SP 500 Series 2,** as specification. Complete with holder for cells 1 mm to 40 mm path length, tungsten lamp, deuterium arc lamp, red and blue sensitive photocells, amplifier, null-indicating system, direct read-out system, built-in power supply units, dust cover and instruction manual. **Without cells.** For 100/120V or 200/250V 50/60 Hz single phase supplies.
Each **£930·00** *f*

When ordering please state voltage and frequency of supply.

NOTE:

Prices given are for U.K. only. Export prices on application.

ACCESSORIES

SL-533 **Cells,** fused, silica, with lid.

Light path	1	2	5	10	20	40 mm	
Each	**£5·25**	**5·25**	**4·90**	**4·60**	**5·50**	**6·40**	*fS*

SL-513	**Cells,** fused glass	For prices see entries in List No. sequence.	
SL-516	**Microcell,** fused glass, 10 mm ...		
SL-518	**Microcell,** fused glass, 20 mm ...		
SL-536	**Microcell holder**	Each **£7·80**	*f*
SL-538	**Constant temperature cell holder SP 507,** for four cells up to 10 mm path length	Each **£19·50**	*f*
SL-550	**Programme controller SP 505,** enables cells to be selected automatically for measurement at the selected wavelength. May be triggered remotely. Requires but does not include SL-551	Each **£160·00**	*f*
SL-551	**Automatic cell changer SP 506,** for use with SL-550.	Each **£57·00**	*f*
SL-554	**Automatic sample changer SP 40,** successively feeds up to fifty samples from the glass containers to a semi-micro flow cell. Includes flow cell interface kit. Requires but does not include recorder SL-556 ...	Each **£304·50**	*f*
SL-556	**Recorder SP 22,** linear/log strip chart, 10 mV full scale sensitivity. Absorbance range 0 to 1 or 0 to 0·5. Motor speed 4, 6 or 10 rev/min	Each **£320·00**	*f*

When ordering please state voltage and frequency of supply, motor speed and absorbance range required.

SL-558

CONCENTRATION READOUT UNIT, *Pye Unicam* **SP 45,** for use with SP 500 Series 2 and SP 600 Series 2 spectrophotometers. Provides direct presentation of spectrophotometric results on a linear concentration scale. Switched control offers ×1, ×2, ×5 and ×10 concentration ranges with variable curvature correction. Provides also absorbance ranges 0–0·1A, 0–0·2A, 0–0·5A and 0–1·0A, all accurate to better than 1% full scale. Temperature stabilised and with recorder and print outlet facilities. For 110/240V 50/60 Hz single phase supplies.
Each **£206·00** *f*

When ordering please state voltage and frequency of supply.

Items on this page coded *S* normally available from stock.

SP 1800 SPECTROPHOTOMETER

190-850 nm

For accurate single, multiple and scanned wavelength analyses in the ultraviolet and visible regions

SL-565 with accessories

TECHNICAL DATA

Range	190–700 nm or 190–850 nm with extended range and red sensitive detector
Sources	Tungsten and deuterium arc lamps with manual/auto selector
Slits	Bilateral slits continuously variable from 0·1 to 1·0 mm. Low energy warning light.
Monochromator	Ebert F/10 monochromator using replica grating
Detectors	EMI 9634QB standard and 9558BQ red sensitive photomultipliers
Wavelength accuracy	±0·5 nm over whole range
Photometric accuracy	±1% full scale on all ranges
Photometric reproducibility	1% full scale on all ranges
Wavelength reproducibility	0·5 nm over whole range
Limiting resolution	0·1 nm
Stray light	1% at 200 nm
Electronics	Fully stabilised solid state electronics on printed circuit boards
Presentation	Integral 14 cm scale meter. Switch selector for 0–2, 0–1, 0–0·5 and 0–0·2 linear absorbance ranges and linear concentration range. Wide range zero suppression
Dimensions and weight	78·6 × 55·4 × 33·2 cm, 70 kg
Power requirements	200/250V 50/60 Hz (130VA) 110/120V 50/60 Hz

- **Double beam operation**
- **Constant bandpass Ebert grating monochromator**
- **Readout on integral meter, recorder or digital printer**
- **Range of accessories includes auto wavelength drive**

SL-565

SPECTROPHOTOMETER, *Pye Unicam* **SP 1800A,** as specification, for 190–700 nm. With tungsten and deuterium arc lamp sources, monochromator and photomultiplier detector, meter readout with four linear absorbance scales and concentration scale. Includes two 10 mm fused silica cells, cell holders, set of test filters and attenuators, tool kit, dust cover and instructions manual.

Each **£1185·00** *f*

SL-567

SPECTROPHOTOMETER, *Pye Unicam* **SP 1800B,** as SL-565 but with extended wavelength range 190–850 nm and red sensitive photomultiplier detector.

Each **£1320·00** *f*

When ordering please state voltage and frequency of supply.

ACCESSORIES

SL-571	**Wavelength drive unit SP 1804,** with five scanning speeds and fixed wavelength selection. Built-in auto-stops limit the scan to the desired wavelength range. Price if ordered with spectrophotometer.	Each	**£104·00**	*f*
SL-572	**Chart synchroniser SP 1808,** for synchronisation of the monochromator with the slave recorder chart. Permits superimposed repeat scans. Price if ordered with spectrophotometer.	Each	**£70·00**	*f*
SL-573	**Specular reflectance accessory SP 840.**	Each	**£26·00**	*f*
SL-574	**Spectrofluorimeter accessory SP 860.**	Each	**£159·00**	*f*
SL-575	**Diffuse reflectance accessory SP 890.**	Each	**£97·00**	*f*
SL-576	**Constant temperature cell housing SP 870.**	Each	**£101·80**	*f*

Many other accessories are available including demountable variable path length cell holder, microcell holder, recorder, digital printer, auto sample changer, etc. Full details on request.

NOTE:

Prices given are for U.K. only. Export prices on application.

SP 800 SPECTROPHOTOMETER

190—850 nm or 52,500—11,500 cm^{-1}

A simple and inexpensive double-beam recording instrument for routine measurements in the ultraviolet and visible regions

- **Fully automatic recording**
- **Flat bed recorder**
- **Large sample compartment**
- **Second sample position for turbid solutions**
- **Automation system available for kinetic measurements**
- **Linear absorbance scale 0–2·0A with adjustable base line cam**

NOTE:

Prices given are for U.K. only. Export prices on application.

A self contained, line operated, double beam recording instrument suitable for a very wide range of applications. The basic instrument is available, calibrated in either wavelength or wavenumber, recording on an integral flat bed recorder. Automation accessories allow the instrument to record at fixed wavelength with up to 4 samples and repeat scan over wavelength. Other accessories include a device for scale expansion on to an external recorder, thermostatted cells, diffuse reflectance attachment for colour measurement and a spectrofluorescence accessory.

TECHNICAL DATA

Double beam, optical null recording spectrophotometer giving linear absorbance scale 0–2·0A. Monochromator comprises a 30° back-silvered ultraviolet grade silica prism in Littrow mounting. Sources comprise tungsten and deuterium lamps with automatic interchange at 370 nm.

Wavelength range	190—850 nm or 52,500—11,500 cm^{-1}
Accuracy	±0·4 nm at 200 and 250 nm ±40 cm^{-1} at 50,000 cm^{-1} ±2·0 nm at 500 nm ±80 cm^{-1} at 20,000 cm^{-1}
Reproducibility	±0·1 nm at 200 and 250 nm ±15 cm^{-1} at 50,000 cm^{-1} ±1·0 nm at 500 nm ±15 cm^{-1} at 20,000 cm^{-1}
Photometric accuracy	±0·02 absorbance units up to 1·6A
Photometric reproducibility	±0·005 absorbance units
Flatness of A=O line	±0·01 absorbance units
Stray light	Less than 1% at 200 nm
Resolution	190—370 nm 0·1—0·4 nm 370—700 nm 0·4—2·0 nm
Scan time	2 or 8 min per chart
Chart size	Foolscap ruled 15×28 cm grid
Sample compartment	25×12×14·5 cm high

SL-595 with SL-600, SL-604, SL-605

SL-595

SPECTROPHOTOMETER, *Pye Unicam* **SP 800A, as specification, with linear wavelength scale, standard model range 190—700 nm.** Complete with deuterium and tungsten sources, fused silica prism in thermostatic compartment, variable slit programme, photomultiplier detector and flat bed recorder. Includes also chart paper and instructions manual. **Without cells.** For 190/250V 50 Hz supplies ... ... Each **£1790·00** *f*

SL-596

SPECTROPHOTOMETER, *Pye Unicam* **SP 800B, as SL-595 but with linear wavelength scale, red sensitive model range 190—850 nm** ... Each **£1930·00** *f*

SL-597

SPECTROPHOTOMETER, *Pye Unicam* **SP 800C, as SL-595 but with linear wavenumber scale, standard model range 52,500—14,000 cm^{-1}** ... Each **£1790·00** *f*

SL-598

SPECTROPHOTOMETER, *Pye Unicam* **SP 800D, as SL-595 but with linear wavenumber scale, red sensitive model range 52,500—11,500 cm^{-1}.** Each **£1930·00** *f*

ACCESSORIES

SL-600 **Scale expansion accessory SP 850.** A plug-in unit for slave recording of absorbance against time at constant wavelength or the expansion of the absorbance scale by factors of ½, 1, 2, 5, 10, 20, etc., and on to DMS cards. Each **£115·00** *f*

SL-602 **Constant temperature cell holder SP 870,** to fit the main cell compartment. Accepts standard cells up to 40 mm and microcells up to 20 mm path length. Temperature control is electrical in the range 30—100°C or by hot water circulation in the range 30—70°C. Each **£101·80** *f*

SL-604 **Constant wavelength/wavenumber scanner SP 820,** scan time 20 min ... ... Each **£94·00** *f*

SL-606 **Programme controller SP 825.** Must be used with SL-604 ... ... Each **£173·00** *f*

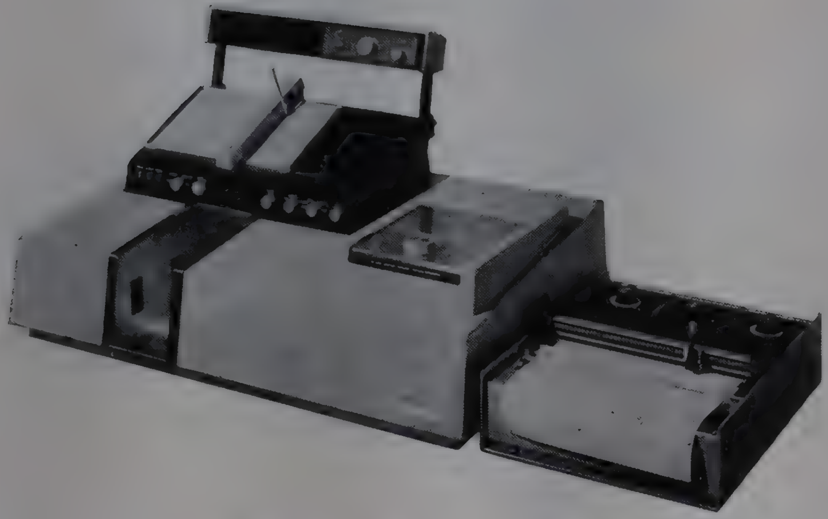
SL-608 **Spectrofluorimeter accessory SP 860.** Each **£159·00** *f*

SL-612 **Diffuse reflectance accessory SP 890.** Each **£97·00** *f*

When ordering please state voltage and frequency of supply.

SP 1200 SERIES SPECTROPHOTOMETERS

400-4000 cm^{-1}
Infrared spectrophotometers combining simplicity and ease of operation with high performance and versatility
Double beam



SL-625 with SL-627 and SL-648

- **Flat bed recording**
- **Linear wavenumber presentation**
- **Simple operation and maintenance**
- **Optional repeat scanning device**

TECHNICAL DATA

Range	400–4000 cm^{-1} (25–2 nm)
Source	Air-cooled 4 mm Nernst filament
Slits	$\frac{1}{4}$E and 1·4E
Dispersing element	Two gratings 1500 and 4500 lines/in with four order sorting filters
Detector	Solay pneumatic cell
Wavenumber accuracy	$\pm$1·5 cm^{-1} at 1000 cm^{-1} $\pm$4·5 cm^{-1} at 3000 cm^{-1}
Wavenumber reproducibility	$\pm$1 cm^{-1} at 1000 cm^{-1} $\pm$3 cm^{-1} at 3000 cm^{-1}
Photometric accuracy	$\pm$1% transmittance from 100% to 5% transmittance
Photometric reproducibility	1% transmittance
Resolution	1 cm^{-1} at 1000 cm^{-1} 3 cm^{-1} at 3000 cm^{-1} ($\frac{1}{4}$E)
Stray light	Less than 1% over most of range; less than 4% at 410 cm^{-1}
Presentation	Overall chart size 32·5 × 20·4 cm; 5 10 and 30 min/chart scan speed selector
Dimensions and weight	90 × 56 × 40 cm, 90 kg
Power requirements	180/250V 50 Hz (700VA max)

NOTE;
Prices given are for U.K. only. Export prices on application.

SL-615

SPECTROPHOTOMETER, *Pye Unicam* **SP 1200,** as specification, with Nernst source, beam alternator, dispersing element, detector and flat bed recorder. Includes 200 sheets of chart paper, ring binder for recorded spectra, polystyrene calibrator, wavenumber measuring rule, one spare ball-point pen and set of fuses. **Without cells.** For 180/250V 50 Hz single phase supplies.
Each **£2175·00** *f*

SL-620

SPECTROPHOTOMETER, *Pye Unicam* **SP 1200A,** as SL-615 but with automatic grating interchange and built-in scan programmer, for interrupted elution gas chromatograph analyses. **Without cells.** For 180/250V 50 Hz single phase supplies ... ... Each **£2335·00** *f*

When ordering please state voltage and frequency of supply.

ACCESSORIES

SL-627	**Scale expansion accessory SP 250,** providing ordinate expansion factors of $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 5, 10 and 20 × and calibrated back-off control. Requires but does not include recorder SL-648 ... ... Each **£115·00** *f*
SL-648	**Recorder AR 25.** For details and price see entry in List No. sequence.

Other accessories available include Specular Reflectance Accessory, Attenuated Total Reflectance Accessory, Polariser Accessory, cells and sample handling equipment for liquids, solids and gases. Details on request.

SP 90 SERIES 2
ATOMIC ABSORPTION SPECTROPHOTOMETERS

SINGLE BEAM

190-852 nm

For analysis of a wide range of elements in solution

- **Linear absorbance presentation**
- **Built-in continuous scale expansion**
- **Built-in flame emission facility**
- **Wide choice of flame and burner systems**
- **Multiple lamp turret**

Radiation characteristic of the element to be determined is emitted by the appropriate hollow cathode lamp mounted in a convenient rapid-focus holder. The radiated beam is focused through the flame where it is quantitatively absorbed by the atoms of the element under analysis. The residual beam then passes through the monochromator on to the photomultiplier detector. The lamp power supply is modulated and the amplifier tuned to the same frequency in order to minimise background and flame interference.

TECHNICAL DATA

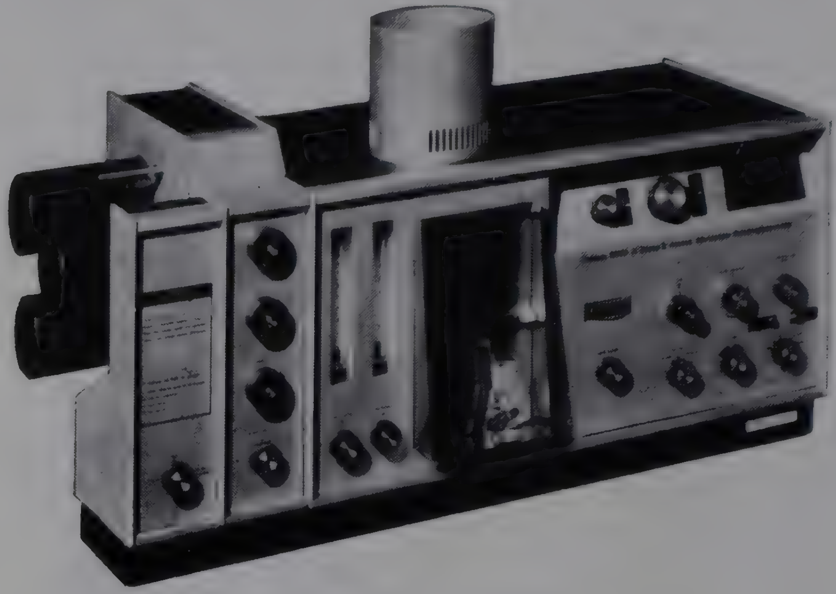
Ranges	190 to 770 nm and 190 to 852 nm
Sources	Hollow cathode lamps
Slits	Continuously variable to 1·5 mm
Monochromator	Littrow type with silica prism
Detector	Photomultiplier
Presentation	Integral meter calibrated 0–1 linear absorbance with switched linear transmission scale. Integral scale expansion up to 10 × absorbance and 50 × transmission
Wavelength stability	0·06 nm/degC at 300 nm
Bandwidth	0·3 nm at 200 nm; 0·6 nm at 250 nm; 3·2 nm at 400 nm with 0·1 mm slit
Sample uptake rate	Normally 3 to 4 ml/min
Dimensions and weight	69·5 × 47 × 40 cm, 68 kg
Power requirements	220/240V 50 Hz single phase (200VA max)

NOTE

Prices given are for U.K. only. Export prices on application.

SL-640

ATOMIC ABSORPTION SPECTROPHOTOMETER, *Pye Unicam* **SP 90A Series 2, wavelength range 190–770 nm.** With prism monochromator, sampling system, air/acetylene, air/propane and emission burner heads, detector, stabilised power unit and meter with linear absorbance and transmission ranges. Includes one lamp holder, twelve sample containers, two lengths of pressure hose, spare fuses, instructions manual, dust cover and set of analytical method sheets. For 220/240V 50 Hz single phase supplies ... ... Each **£1020·00** *f*



SL-640 with accessories

SL-642

ATOMIC ABSORPTION SPECTROPHOTOMETER, *Pye Unicam* **SP 90B Series 2,** as SL-640 but **with extended wavelength range 190–852 nm.** For 220/240V 50 Hz single phase supplies ... Each **£1220·00** *f*

When ordering please state voltage and frequency of supply.

ACCESSORIES

SL-644 **Hollow cathode lamp,** complete with holder. Available for the following elements.

Al	Ca	Hf	Ca/Mg	K	Ag	Ti
As	Ce	In	Mn	Pr	Na	W
Sb	Cr	Ir	Mo	Re	Sr	U
Ba	Co	Fe	Nd	Rh	Ta	V
Be	Cu	La	Ni	Ru	Tl	Y
Bi	Eu	Pb	Nb	Sm	Th	Yb
B	Ge	Li	Pd	Sc	Tm	Zn
Cd	Au	Mg	Pt	Si	Sn	Zr

Prices on application.

When ordering please specify element to be detected.

SL-645 **Lamp turret SP 91,** Series 2, with two hollow cathode lamp holders. Price if ordered with spectrophotometer. Each **£118·50** *f*

SL-646 **Nitrous oxide system SP 94,** Series 2, complete with burner for high temperature nitrous oxide/acetylene flame. For 220/240V 50 Hz single phase supplies. Price if ordered with spectrophotometer ... Each **£71·00** *f*

SL-647 **Automatic sample changer SP 92,** for routine testing of up to 32 samples at one loading. For 220/240V 50 Hz single phase supplies ... ... Each **£120·00** *f*

SL-648 **Recorder AR 25** option 2. For 220/240V 50 Hz single phase supplies ... ... Each **£280·00** *f*

SL-649 **Digital printer SP 46F,** five channel ... Each **£690·00** *f*

CARE AND MAINTENANCE OF AG, *QUICKFIT* AND *CLEARFIT* STANDARD JOINT GLASSWARE

CLEARFIT JOINTS

These joints, manufactured to BS 572 by a precision process which obviates the necessity of grinding, are completely interchangeable with ground joints and offer several notable advantages. In particular they are less liable to leakage, require less lubrication and, on account of the smooth surface, suffer less from seizure.

Apart from these points, the notes which follow are relevant in greater or lesser degree to all forms of glass joints and the apparatus of which they form parts.

CARE OF GLASS JOINTS

All joints should be completely free from dirt, as dust may cause leakage and grit may even cause breakage. Therefore, as a matter of routine, before use all joints should be wiped free from foreign matter. After use at elevated temperatures joints should be separated as soon as possible, preferably whilst still warm.

LUBRICATION AND SEIZURE

Lubrication fulfils one or more of three purposes: to prevent leakage, to protect the surface of the joint, to facilitate separation of the joint. For many purposes in preparative organic chemistry, apparatus with glass joints can be used without lubricant, but if lubricant is desirable it can be chosen from the selection in this catalogue under the title LUBRICANTS.

Strong caustic should never be allowed to remain in contact with ground joint surfaces. Its attack on the precision ground faces is quite rapid and if left in an assembled joint it cements it together very effectively and damages the surfaces for future use.

Parting of the joints while apparatus is still warm is recommended for prevention of seizure. When seizure has taken place, separation can sometimes be effected by soaking in a suitable solvent or by localised gentle heating of the socket such as under the stream of hot water from a tap or over a very gentle flame.

CLAMPING

Since conical joints are rigid, only one clamp should be tightened on a piece of apparatus unless flexibility is provided between the clamps by some other form of joint. Supporting rather than clamping should always be the principle with assemblies of glassware. It is advisable to adjust and, where applicable, tighten the jaws of the clamp first and then to adjust and tighten the bosshead on the clamp and finally on the stand.

SCRATCHES

Care should be taken to avoid scratches on the surfaces of glassware as these reduce the mechanical strength of the glass and make it more susceptible to breakage through thermal shock. Scratches sufficient to result in breakage can be made by glass stirrers, by rubbing or knocking two pieces of glassware together, or by the metal stems of cleaning brushes. A common error is to use a glass stirring rod which has not been protected by the fitting of a rubber policeman. Care in handling, cleaning and storage of glassware items will lengthen their life significantly.

CLEANING

Cleaning is much easier to carry out when the residue is new. It is, therefore, recommended that it should be done immediately after use.

Glassware can usually be cleaned simply by washing with hot detergent. Remove organic material by a suitable solvent or by the use of dichromate cleaning mixture. With obstinate residues the action of detergent or solvent can be much improved by immersion in an ultrasonic cleaning bath (see UL-150).

TYPES OF JOINT

Conical joints to BS 572 are fitted to all AG, *Quickfit* and *Clearfit* apparatus. This British Standard conforms to the internationally approved ISO R 383 to ensure interchangeability among joints produced in most of the major manufacturing countries of the world.

The former BS nomenclature for joint lengths, viz. the A,B,C and D length joints, has been discontinued in favour of the ISO system of two figures separated by an oblique stroke. The first figure represents the large end diameter of the joint in millimetres (rounded to the nearest whole number), the figure after the oblique stroke being the nominal length of ground zone, also in millimetres.

Thus for example:
B 19 is now 19/26 and C 19 is 19/17.

Spherical (ball and cup) joints to BS 2761 also conform to the draft international requirements of ISO R641. These joints may be used to introduce a degree of flexibility into a complex system and thus to minimise breakage. They are more easily separated than conical ground joints when used with materials tending to seizure.

Flat flange joints are available in larger diameters than conical or spherical joints and also have the advantages of easy separation.

Screw thread joints comprising glass threads fitted with plastics screw caps and sealing washers provide a convenient means of achieving adjustable depth of insertion for such items as gas or steam entry tubes or thermometers.

BURETTE AND FUNNEL STANDS

SINGLE STAND WITH HARDWOOD HOLDERS

SM-210

STAND, hardwood, single, with base 20×12·5 cm and vertical rod 46×2 cm to take burette holder SM-212 or funnel holder SM-214. Ten £3·70 Each £0·43 c

SM-212

BURETTE HOLDER, hardwood, for one burette. Ten £4·00 Each £0·46 c

SM-214

FUNNEL HOLDER, hardwood, for one funnel up to 12 cm diameter ... Ten £3·30 Each £0·39 c

DOUBLE STANDS WITH HARDWOOD HOLDERS

SM-230

STAND, hardwood, double, with base 28×12·5 cm and vertical rod 46×2 cm to take burette holder SM-242, burette/funnel holder SM-243 or funnel holder SM-244. Ten £4·00 Each £0·46 c

SM-241

STAND, as SM-230 with hardwood rod, but with stoved white epoxide resin finished cast iron base 29×14 cm. Ten £18·00 Each £2·00 c

SM-242

BURETTE HOLDER, hardwood, for two burettes. Ten £5·10 Each £0·57 c

SM-243

BURETTE/FUNNEL HOLDER, hardwood, for one burette and one funnel up to 12 cm diameter. Ten £5·70 Each £0·64 c

SM-244

FUNNEL HOLDER, hardwood, for two funnels up to 12 cm diameter... Ten £3·70 Each £0·43 c

DOUBLE STAND AND BURETTE HOLDER

SM-434

STAND, double. Stoved white finished cast iron. For details and price see entry in List No. sequence.

SM-290

BURETTE HOLDER, *Gallenkamp*, for two burettes, providing an instantaneous positive grip and release. The burettes are held firmly and safely in rubber lined jaws without obscuring the graduations. The holder is constructed from diecastings finished in white enamel. The offset mounting of the spring loaded clamp arms prevents downward motion through the clamp. A single thumb screw secures the clamp to rods of nominal 13 mm dia. which may be vertical or horizontal. Ten £17·00 Each £1·90 b

REPLACEMENT PART

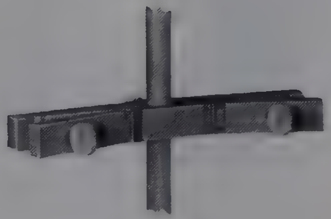
SM-293 Rubber cushions ... ... Pack of 10 £0·20 b

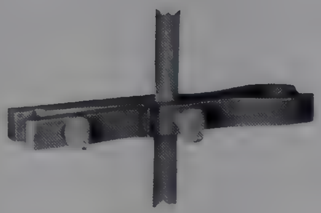
BURETTE STANDS for burettes mounted on 500 ml reservoir bottles see BW-880 and BW-881 in List No. sequence.

For white enamelled cast iron burette stands see SM-432 and SM-434 in List No. sequence.

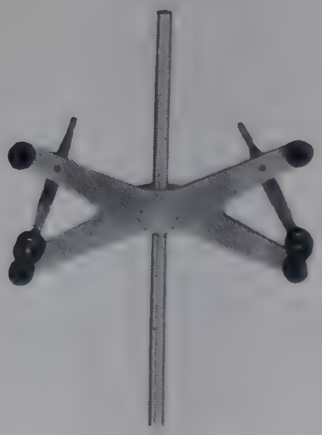
SM-214

SM-210
with SM-212


SM-242

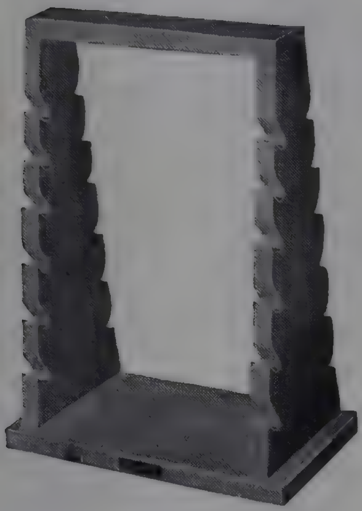

SM-243

SM-230
with SM-244


SM-290
with rod

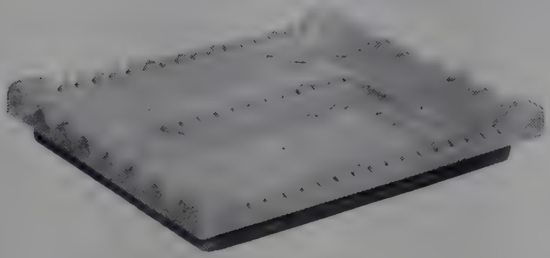
All items on this page normally available from stock.

PIPETTE STANDS AND LABORATORY JACK



SM-310

SM-330



SM-335

PIPETTE RACKS, wall fixing see FV-241 and FV-243 in List No. sequence.

SM-310

STAND, PIPETTE, hardwood, to hold twelve pipettes horizontally, six on either side.
Ten **£12·60** Each **£1·40** *c*

SM-330

STAND, PIPETTE, comprises two polished wood disks mounted, by a vertical plated rod, on an iron tripod foot, to hold eighteen pipettes vertically.
Ten **£48·00** Each **£5·30** *c*

***SM-335**

PIPETTE SUPPORT TRAY, PVC, 28 × 21 × 2 cm deep. With corrugated rim and off-centre support for short pipettes ... ... Each **£1·25** *m*

For the general properties of PVC see page 606.

LABJACK

The Labjack has applications in almost every laboratory for raising and lowering equipment with smooth, precise control.

It is particularly convenient for:

- operations which require the very careful raising or lowering of water baths, oil baths, heating mantles and similar equipment.
- supporting Dewar flasks containing refrigerants used with cooling traps in vacuum systems.
- supporting flasks which must be readily removable, for instance in assemblies of interchangeable joint glassware.

The Labjack is very robustly constructed of heavy section aluminium alloy with anodised finish and is rigid in all positions of use without the necessity for clamping screws. The lifting mechanism is operated by a deeply corrugated plastics knob. Minimum height is 7·5 cm and maximum 27 cm. Maximum loads of over 25 kg can be lifted in the upper part of the range but in the lower range must be limited to about 9 kg on account of the extreme leverage at small angles of opening.

The top plate is 12·5 × 15 cm and can be extended to 20 cm square by the accessory plates SM-352. These plates can be bolted to the Labjack and are drilled to accept either one or two, 13 mm diameter, retort stand rods secured to the base plate and projecting through the top plate. Apparatus can be clamped to the rods whilst allowing the platform to be adjusted.

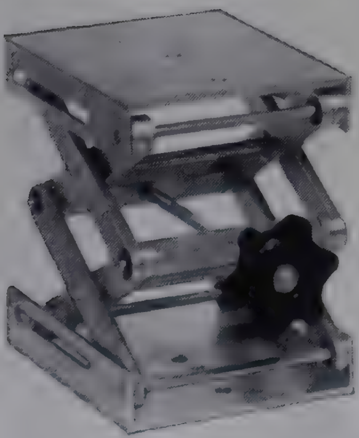
SM-350

LABJACK, as above specification ... Each **£9·75** *m*

ACCESSORIES

SM-352 **Plates,** aluminium, 20 cm square, for bolting to Labjack, drilled to accept retort stand rods, complete with securing nuts ... ... Pair **£2·20** *m*

SM-450	**Retort stand rods,** cadmium plated	For details and prices see entries in List No. sequence.
SM-452	**Retort stand rods,** stainless steel	
SM-454	**Retort stand rods,** duralumin ...	



SM-350

SM-350 with SM-352 and rod

SPECIAL PURPOSE STANDS AND CLAMPS

Westergren pipette stands
see MEDICAL SCIENCES

Multiple clamp for micro-Kjeldahl apparatus
see NITROGEN DETERMINATION

All items on this page normally available from stock.

RETORT STANDS

(Dimensions and weights given below are nominal)

BASES

SM-430

RETORT STAND BASES, rectangular, cast iron finished in stoved grey enamel, with hole at the centre of one end, tapped with metric thread M10×1·5. **For suitable rods see SM-450, SM-452 and SM-454.**

Size	A	B	C	D	E	
Length	15	18	22	25	30 cm	
Width	10	12	14	17	20 cm	
Weight	1	1·4	1·7	2·5	3·5 kg	
Recommended length of rod	45	53	60	75	90 cm	
Ten	**£5·20**	**6·60**	**7·20**	**11·00**	**13·60**	c
Each	**£0·57**	**0·74**	**0·80**	**1·25**	**1·55**	

SM-432

RETORT STAND BASES, rectangular, stoved white resin finished cast iron, otherwise as SM-430.

Size	A	B	C	D	E	
Ten	**£5·80**	**7·80**	**9·00**	**12·80**	**15·50**	c
Each	**£0·64**	**0·88**	**1·00**	**1·45**	**1·75**	

SM-434

RETORT or BURETTE STAND BASE, double. Stoved white resin finished, rectangular cast iron with central hole tapped with metric thread M10×1·5. **For suitable rods see SM-450, SM-452 and SM-454.**

Ten **£14·80** Each **£1·65** c

SM-436

RETORT STAND BASES, tripod shape stoved grey enamel cast iron, with rubber feet and hole tapped with metric thread M10 ×1·5. **For suitable rods see SM-450, SM-452 and SM-454.**

Size	A	C	E	
Spread of feet from centre	9	12·5	18 cm	
Weight	1·4	1·6	3 kg	
Recommended length of rod	45	60	90 cm	
Ten	**£10·00**	**12·60**	**18·00**	c
Each	**£ 1·10**	**1·40**	**2·00**	

SM-438

RETORT STAND BASES, nesting tripod pattern, with hole tapped with metric thread M10×1·5. The dimension 'inset dia.' indicates the largest diameter of circular article which can be placed on the bench between the front feet. **For suitable rods see SM-450, SM-452 and SM-454.**

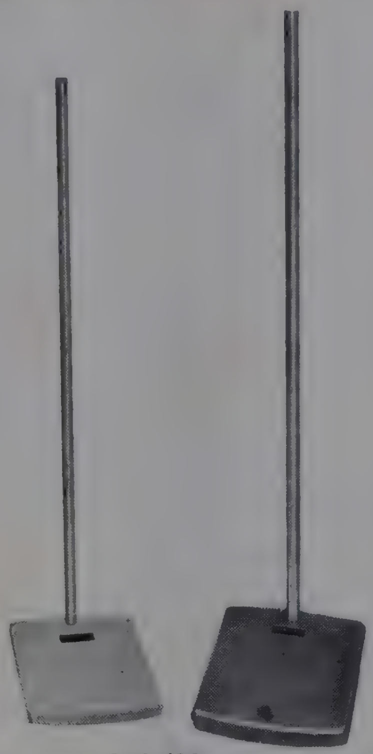
Size	C	E	
Width	18	23 cm	
Depth	20	26 cm	
Inset dia.	15	21 cm	
Weight	1·5	3 kg	
Recommended length of rod	60	90 cm	
Ten	**£8·00**	**13·00**	c
Each	**£0·90**	**1·45**	

RODS

SM-450

RETORT STAND RODS, cadmium plated mild steel with metric thread M10×1·5 at one end.

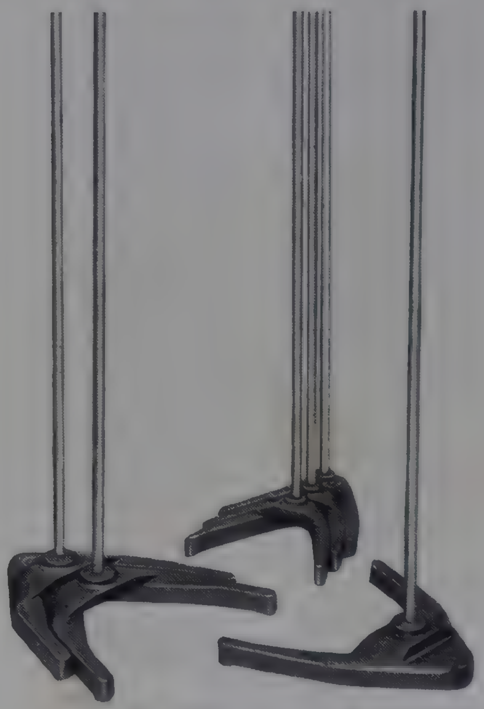
Size	A	B	C	D	E	
Length	45	53	60	75	90 cm	
Diameter	10	10	13	13	13 mm	
Ten	**£2·50**	**2·90**	**3·50**	**4·30**	**5·10**	c
Each	**£0·31**	**0·35**	**0·41**	**0·48**	**0·56**	



SM-430 or SM-432 with rod

SM-434 with rod

SM-436 with rod



SM-438 with rod

SM-452

RETORT STAND RODS, bright finished stainless steel, otherwise as SM-450.

Size	A	B	C	D	E	
Length	45	53	60	75	90 cm	
Diameter	10	10	13	13	13 mm	
Ten	**£6·80**	**7·60**	**14·00**	**17·50**	**22·00**	c
Each	**£0·76**	**0·84**	**1·55**	**1·95**	**2·45**	

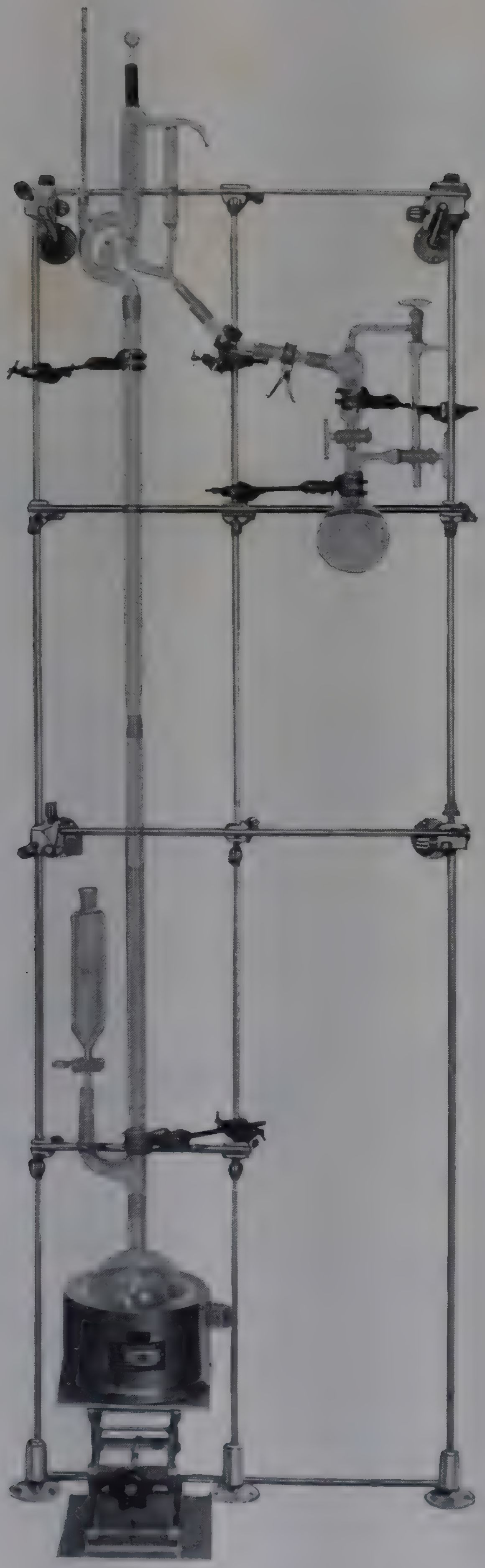
SM-454

RETORT STAND RODS, bright finished duralumin light alloy, otherwise as SM-450.

Size	A	B	C	D	E	
Length	45	53	60	75	90 cm	
Diameter	13	13	13	13	13 mm	
Ten	**£3·30**	**3·90**	**4·30**	**5·00**	**6·00**	c
Each	**£0·39**	**0·44**	**0·48**	**0·55**	**0·66**	

All items on this page normally available from stock.

Gallenkamp LABLOX SCAFFOLDING



The Lablox system comprises a series of versatile components for assembling rigid scaffolding supports for laboratory and pilot plant use.

- **Light weight, strong, rigid scaffolding easily assembled**
- **Infinite variety of assembly shapes and dimensions**
- **Floor, bench and wall mounting facilities**
- **Components are precision diecast aluminium or zinc based alloy**
- **Simple thumb screw or socket headed screw fixing**
- **Connectors accept rod and tubing from 6 to 13 mm dia. and standard retort clamps**
- **Versatile swivels and connectors for difficult mountings**
- **Skew orientation of individual rods or tubes easily achieved**

Where permanent or semi-permanent assemblies of glass and other apparatus are required, *Lablox* scaffolding provides a more safe and convenient means of keeping the assemblies together than if odd retort stands are used.

Tubing and wiring can be clipped along the rods or run through the tubes, to keep them neatly in place. Platforms can easily be constructed from plastics, wood or metal to mount instruments exactly where they are needed, and *Lablox* connectors are available to mount small components directly on the scaffolding. Apparatus may be supported on the scaffolding by means of *Technico* clamps and bossheads and any other standard retort stand fittings. To obtain the best support, bossheads should be attached to the vertical members of the scaffolding.

For the guidance of the user a number of typical *Lablox* scaffolding assemblies are shown on the facing page.

Details and prices of the individual components will be found on pages 696 and 697.

Gallenkamp LABLOX SCAFFOLDING ASSEMBLIES

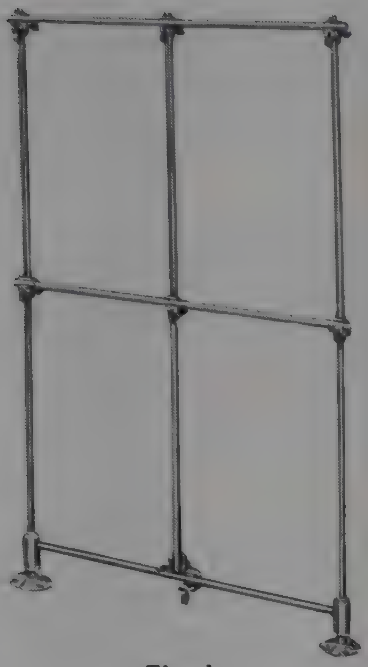


Fig. 1

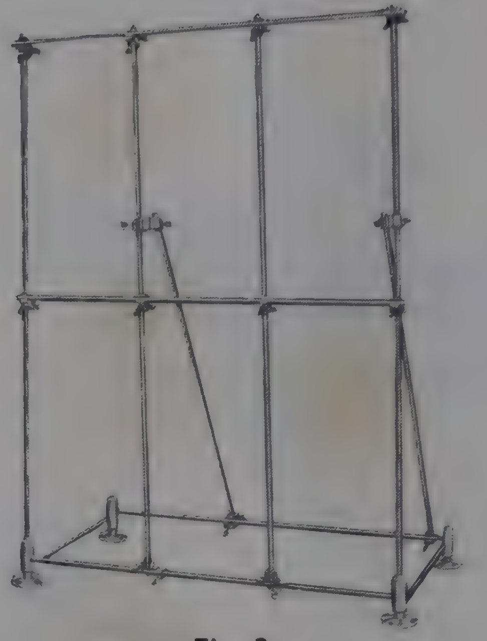


Fig. 2

Fig. 1

6 Connectors, 2-way	**SM-480**
1 Swivel connector, plane	**SM-504**
3 Rods 60 cm	**SM-564**
3 Rods 90 cm	**SM-564**
2 Feet	**SM-510**
2 Adapters	**SM-518**

Wood screws SM-516 also required

Fig. 2

10 Connectors, 2-way	**SM-480**
2 Swivel connectors, 2-way	**SM-500**
2 Swivel connectors, plane	**SM-504**
2 Rods 40 cm	**SM-564**
6 Rods 90 cm	**SM-564**
4 Rods 120 cm	**SM-564**
4 Feet	**SM-510**
4 Adapters	**SM-518**

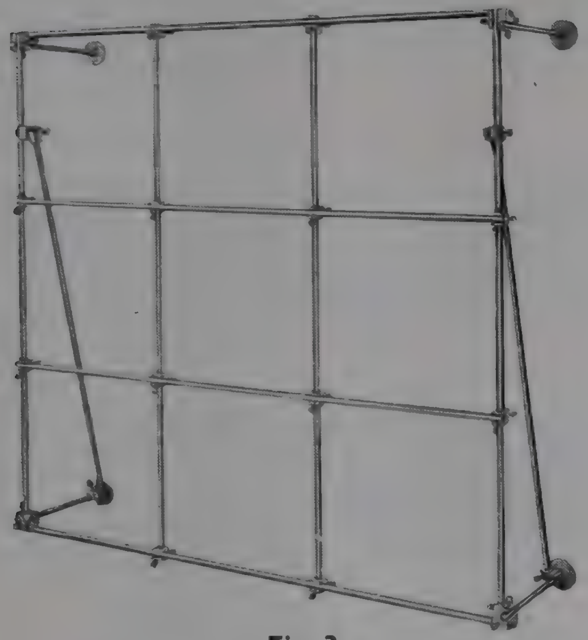


Fig. 3

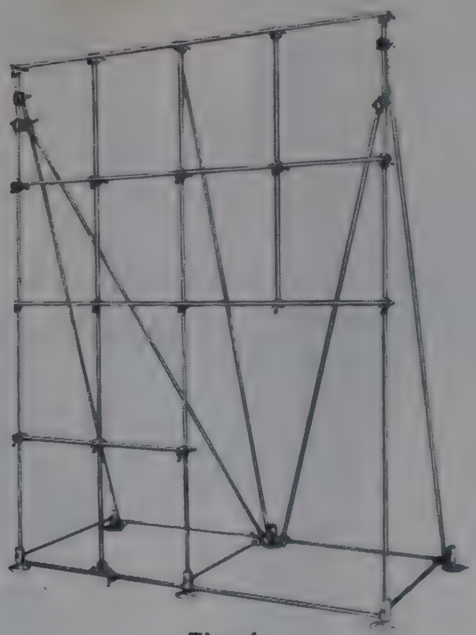


Fig. 4

Fig. 3

12 Connectors, 2-way	**SM-480**
4 Connectors, 3-way	**SM-490**
4 Swivel connectors, 2-way	**SM-500**
4 Rods 40 cm	**SM-564**
2 Rods 90 cm	**SM-564**
8 Rods 120 cm	**SM-564**
4 Feet	**SM-510**

Wood screws SM-516 also required

Fig. 4

18 Connectors, 2-way	**SM-480**
10 Swivel connectors, 2-way	**SM-500**
1 Swivel connector, plane	**SM-504**
4 Rods 60 cm	**SM-564**
1 Rod 90 cm	**SM-564**
5 Rods 120 cm	**SM-564**
9 Rods 180 cm	**SM-564**
6 Feet	**SM-510**
6 Adapters	**SM-518**

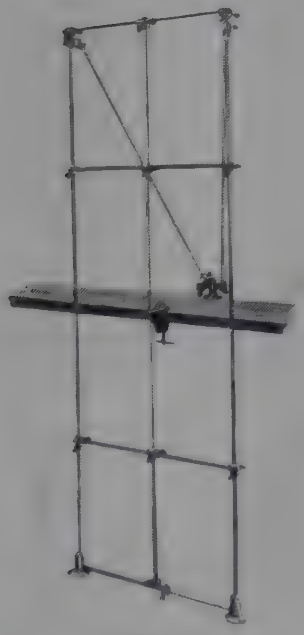


Fig. 5

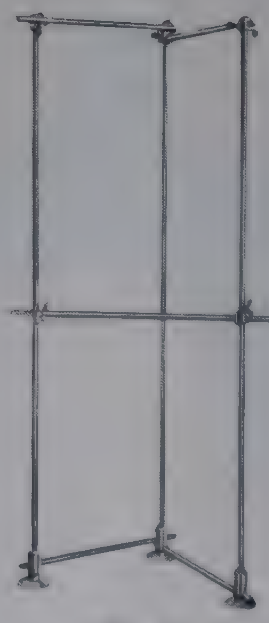


Fig. 6

Fig. 5

9 Connectors, 2-way	**SM-480**
4 Swivel connectors, 2-way	**SM-500**
1 Swivel connector, plane	**SM-504**
1 Clamp	**SM-526**
1 Rod 10 cm	**SM-564**
4 Rods 60 cm	**SM-564**
2 Rods 90 cm	**SM-564**
3 Rods 180 cm	**SM-564**
3 Feet	**SM-510**
3 Adapters	**SM-518**

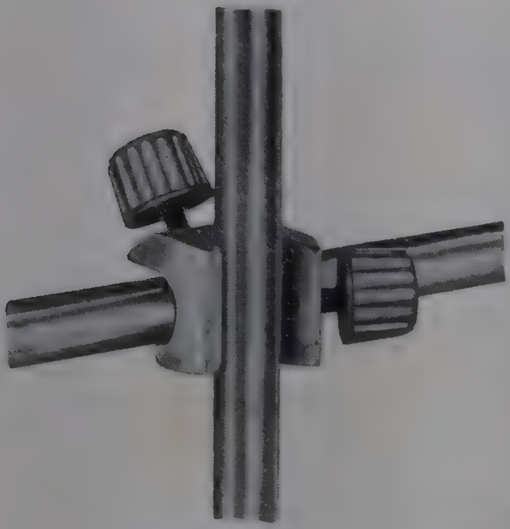
Wood screws SM-516 also required

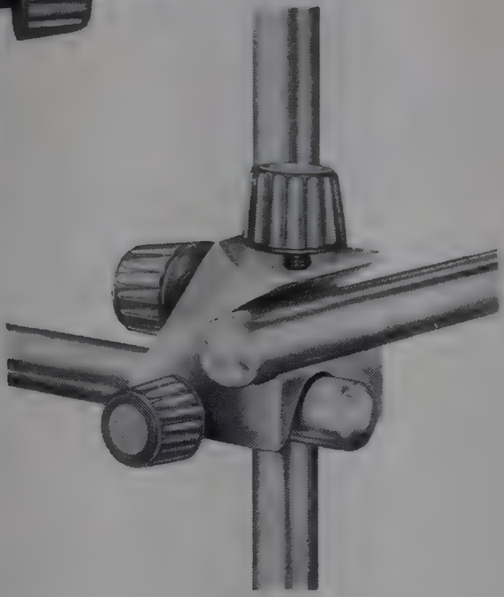
Fig. 6

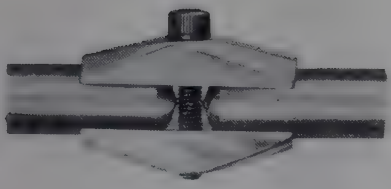
4 Connectors, 2-way	**SM-480**
1 Connector, 3-way	**SM-490**
4 Rods 40 cm	**SM-564**
1 Rod 60 cm	**SM-564**
3 Rods 120 cm	**SM-564**
3 Feet	**SM-510**
3 Adapters	**SM-518**

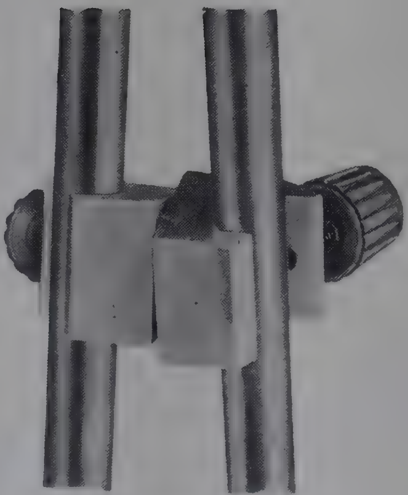
For details and prices of components see overleaf.

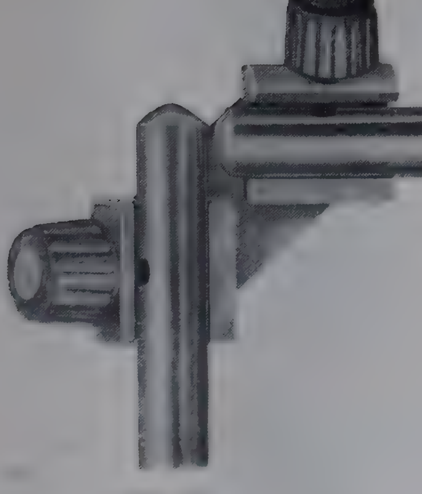
Gallenkamp LABLOX SCAFFOLDING COMPONENTS

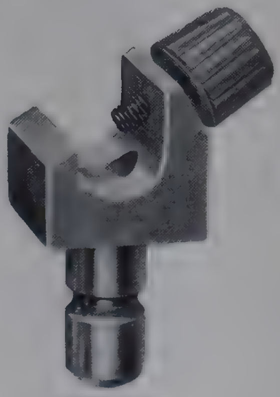

SM-480


SM-490


SM-494


SM-500


SM-504


SM-506

SM-480

CONNECTOR, 2-way, *Lablox*, diecast aluminium alloy with thumb screws for hand tightening. Used for fixing two rods or tubes at right angles to each other. Accepts rod or tubing from 6 mm to 13 mm dia.

Ten **£1·85** Each **£0·25** *b*

ACCESSORIES

SM-484	**Screws, socket headed** to replace thumb screws. Suitable for use with rod or tubing of 13 mm dia.	Pack of 10	£0·20	*b*
SM-486	**Screws, socket headed** as SM-484 but for use with rod or tubing of 6 mm dia.	Pack of 10	£0·25	*b*
SM-488	**Allen key 2·5 mm A/F,** for tightening SM-484 and SM-486	Pack of 10	£0·20	*b*
SM-506	**Swivel adapter.** For details and prices see entry in List No. sequence.			

SM-490

CONNECTOR, 3-way, *Lablox*, as SM-480 but for fixing three rods or tubes mutually at right angles. Accepts rod or tubing from 6 mm to 13 mm dia.

Ten **£3·20** Each **£0·38** *b*

ACCESSORIES

SM-484	**Screws, socket headed** ...	For details and prices see entries in List No. sequence.
SM-486	**Screws, socket headed** ...	
SM-488	**Allen key**	

SM-494

CONNECTOR, in-line, *Lablox*, diecast aluminium alloy with socket headed screw. For butt-joining two lengths of rod or tube end-to-end. Accepts rod or tubing from 6 mm to 13 mm dia. Includes one 4 mm A/F Allen key.

Ten **£2·20** Each **£0·28** *b*

SM-500

CONNECTOR, swivel, 2-way, *Lablox*, diecast aluminium alloy, with thumb screws for hand tightening. For holding two rods or tubes at any angle to each other. The two components are restrained from swivelling freely by an intermediate tension washer. Accepts rod or tubing from 6 mm to 13 mm dia. Ten **£3·40** Each **£0·40** *b*

SM-504

CONNECTOR, plane swivel, *Lablox*, diecast aluminium alloy, with steel strap, with thumb screws for hand tightening. For connecting two rods or tubes which converge at any angle. Suitable for making triangular or square frames for supporting large flanged items such as heating mantles, funnels, etc. Accepts rod or tubing from 6 mm to 13 mm dia.

Ten **£4·20** Each **£0·47** *b*

SM-506

ADAPTER, swivel, *Lablox*, diecast aluminium alloy, with thumb screw for hand tightening. Enables connectors SM-480 and SM-490 to be used as swivel connectors which can be clamped at any required angle for various applications including diagonal bracing.

Ten **£2·75** Each **£0·34** *b*

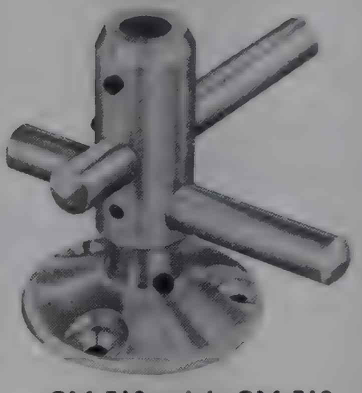
ACCESSORIES FOR SM-500, SM-504 AND SM-506

SM-484	**Screws, socket headed** ...	For details and prices see entries in List No. sequence.
SM-486	**Screws, socket headed** ...	
SM-488	**Allen key**	

All items on this page normally available from stock.

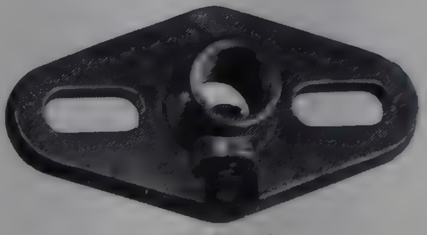
Gallenkamp LABLOX SCAFFOLDING COMPONENTS

SM-510
FOOT, *Lablox*, diecast aluminium alloy, with 3 countersunk holes for screwing foot to bench, floor or wall, and socket headed screw fixing for rod or tubing of 13 mm dia. Requires SM-488 Allen key for tightening and each pack of 10 includes one key ... Ten **£1·80** Each **£0·25** *b*



SM-510 with SM-518

SM-514
FOOT, *Lablox*, diecast zinc alloy with two slotted holes for bolting to Dexion or other types of slotted angle frames, and socket headed screw fixing for rod or tubing of 13 mm dia. Requires SM-488 Allen key for tightening and each pack of 10 includes one key. Ten **£1·90** Each **£0·26** *b*



SM-514

ACCESSORIES FOR SM-510 AND SM-514

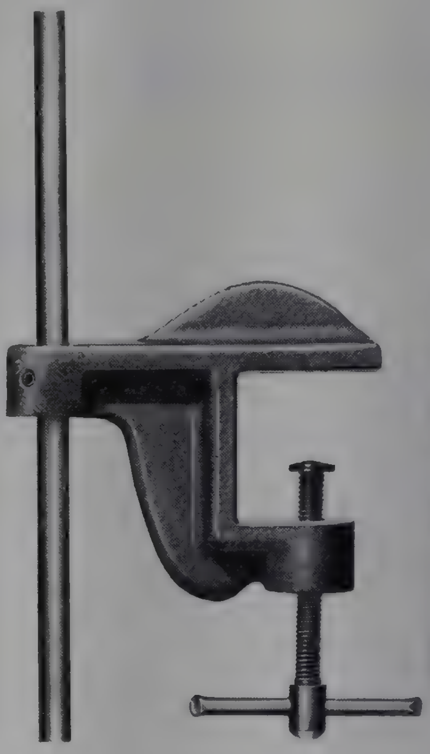
SM-486 **Screw, socket headed** ... } For details and prices see entries in List No. sequence.
SM-488 **Allen key** ... ...
SM-516 **Wood screws,** stainless steel, length 20 mm. Pack of 12 **£0·25** *b*

SM-518
FOOT ADAPTER, *Lablox*, aluminium alloy, with boss to fit feet SM-510 and SM-514. Accepts three 13 mm dia. rods or tubes mutually at right angles, of which two are perpendicular to the boss and the third is in line with the boss. With socket head screw fixings for rods or tubing. Requires SM-488 Allen key for tightening and each pack of 10 adapters includes one key. Ten **£3·40** Each **£0·40** *b*

ACCESSORIES

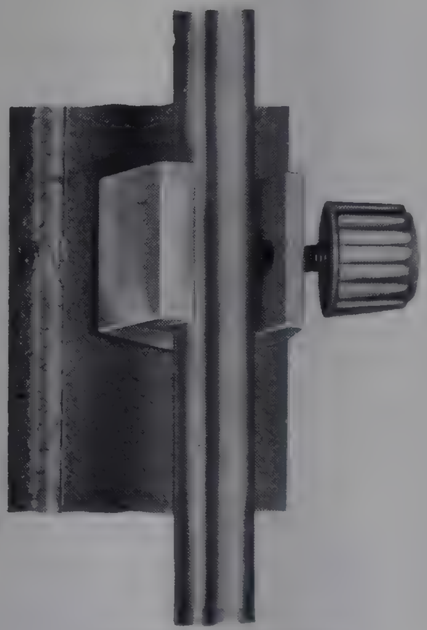
SM-486 **Screws, socket headed** ... } For details and prices see entries in List No. sequence.
SM-488 **Allen key** ... ...

SM-526
CLAMP, G, *Lablox*, enamelled cast iron, for clamping to edge of bench. With socket headed screw fixing for rod or tubing of 13 mm dia. Includes one SM-488 Allen key for tightening ... ... Each **£2·00** *b*



SM-526

SM-532
CONNECTOR, accessory, *Lablox*, diecast aluminium alloy, with thumb screw for hand tightening. With two holes for fixing instrument cases control panels, brackets, safety screens, etc. to scaffold framework by means of two self-tapping screws supplied. A central 6 mm dia. fixing hole is also provided. Can be mounted on rod or tubing from 6 mm to 13 mm dia. Ten **£1·90** Each **£0·25** *b*



SM-532 supporting instrument case

ACCESSORIES

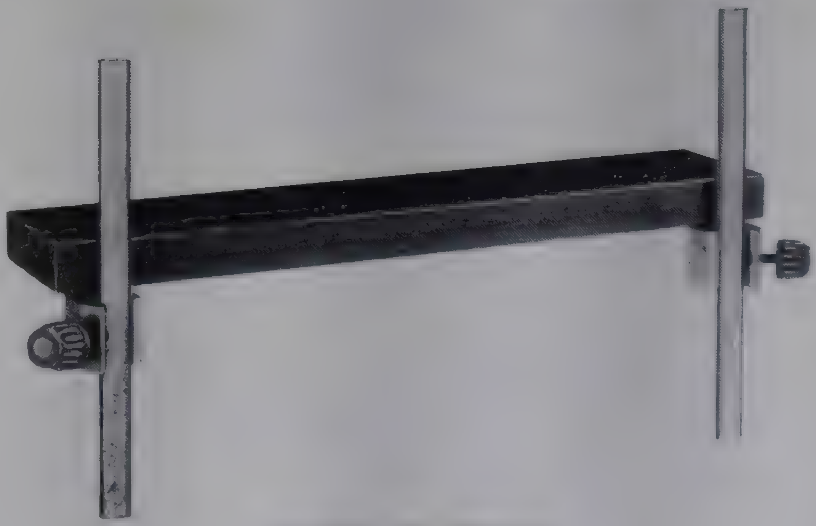
SM-534 **Brackets,** for fixing to SM-532. Can be assembled for horizontal or vertical fixing. With drilled holes 2 cm apart ... ... 5 pairs **£0·60** Pair **£0·13** *b*
SM-484 **Screws, socket headed** ... } For details and prices see entries in List No. sequence.
SM-486 **Screws, socket headed** ...
SM-488 **Allen key** ... ...

SM-564
RODS, *Lablox*, aluminium alloy, 13 mm dia. approx.

Length	10	20	40	60	90	120	180 cm	
Ten	**£1·00**	**1·60**	**2·40**	**2·90**	**4·30**	**5·40**	**7·80**	*b*
Each	**£0·17**	**0·23**	**0·31**	**0·35**	**0·48**	**0·60**	**0·88**	

SM-572
TUBING, *Lablox*, aluminium alloy, 13 mm dia. approx. without end plugs.

Length	100	200 cm	
Each	**£0·40**	**0·70**	*b*



SM-532 with SM-534 supporting shelf on frame

ACCESSORIES

SM-574 **Tubing cutter** ... ... Each **£1·10** *m*
SM-576 **End plugs,** nylon, for closing off the ends of lengths of tubing SM-572. In pack of 10. 10 packs **£1·50** Pack **£0·22** *b*

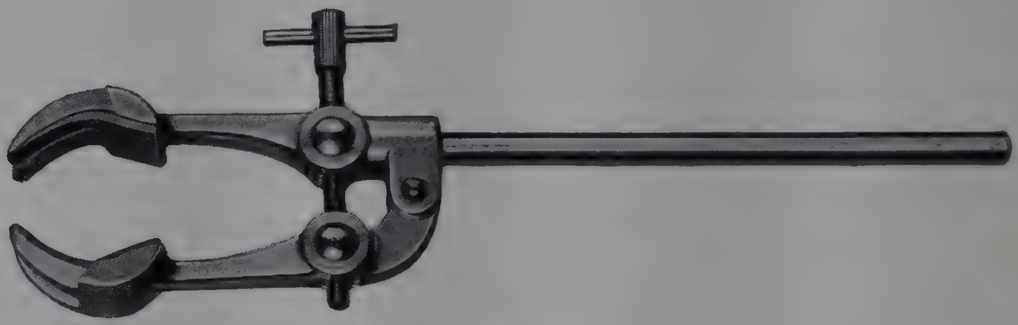
All items on this page normally available from stock.

Technico CLAMP AND BOSSHEAD

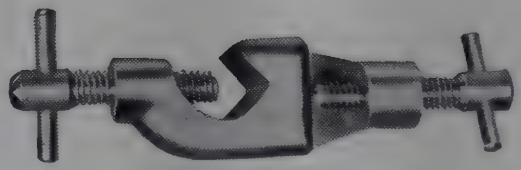
REGD. TRADE MARK

- No iron parts to rust
- Clamp accepts articles between 2 mm and 90 mm diameter
- Well secured cork liners
- Bosshead takes rods up to 16 mm dia. in each jaw
- Mass production methods provide lowest possible price with consistent high quality

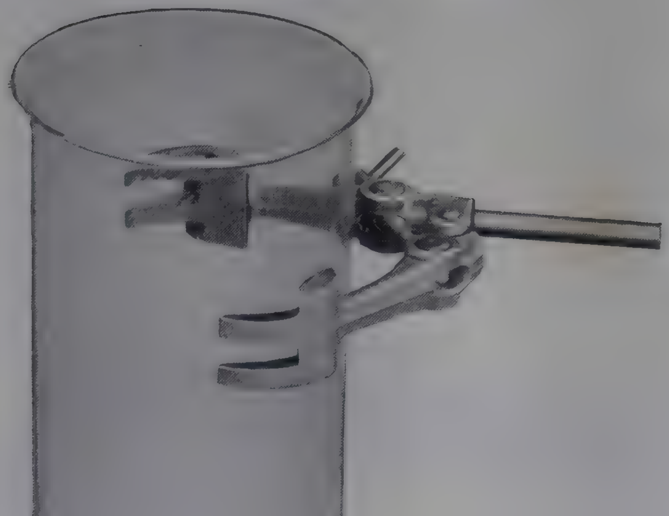
SM-600 extended 6 mm



SM-600



SM-610



SM-600 extended 90 mm

SM-600

CLAMP, RETORT STAND, *Technico*, enables articles between 2 mm and 90 mm diameter to be securely clamped. Comprises a light alloy pressure diecasting with other parts of nickel plated brass. The design of the jaw ensures a firm grip at all angles of opening. The cork liners are secured by an epoxy resin adhesive. With $\frac{5}{16}$ in (8 mm) diameter rod suitable for use in bossheads SM-610, SM-636 and SM-638.

Gross **£70·00** Dozen **£6·60** Each **£0·62** *b*

SM-610

BOSSHEAD, *Technico*, Regd. Design No. 860962, with offset jaws for greatly increased strength. Comprises a light alloy pressure diecasting with clamping screws of nickel plated brass. The vee-grooves in the body are true and give a firm grip in either jaw on rods up to 16 mm diameter.

Gross **£38·00** Dozen **£3·60** Each **£0·36** *b*

All items on this page normally available from stock.

BOSSHEADS

SM-480

CONNECTOR, 2-way, *Lablox,* diecast aluminium alloy with thumb screws for hand tightening. Used for fixing two rods or tubes at right angles to each other. Accepts rod or tubing from 6 mm to 13 mm diameter. For price see entry in List No. sequence.

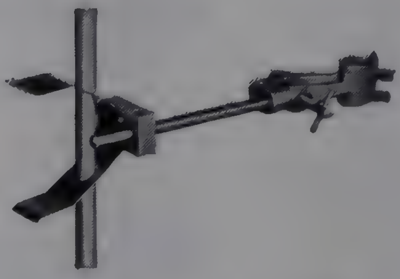
For details of *Lablox* 3-way, in-line and swivel connectors see SM-490 et seq. in List No. sequence.

SM-630

SM-630

BOSSHEAD, aluminium alloy, accepts rods up to 19 mm in both jaws ... ...Ten **£5·70** Each **£0·64** c

SM-636


SM-638 with SM-600

SM-636

BOSSHEAD, aluminium alloy diecasting, to take range of clamps and support plates SM-600 and SM-668 to SM-695 and rings SM-710 and SM-720. The jaw accepts rod up to 16 mm diameter and the bosshead is drilled to take 6 to 8 mm diameter rod, secured by a single socket headed cap screw at right angles to the support rod.
Ten **£2·50** Each **£0·32** c

ACCESSORY

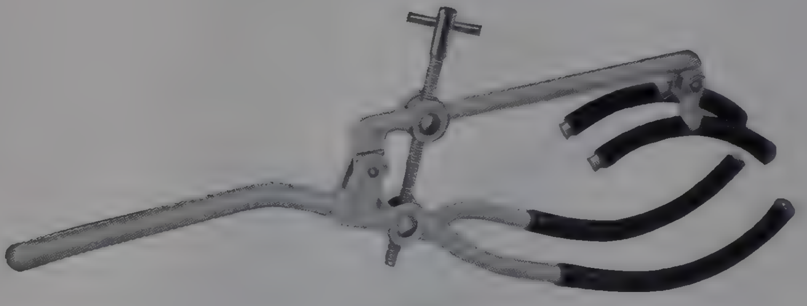
SM-488 **Wrench,** for socket headed cap screws. For price see entry in List No. sequence.

SM-638

BOSSHEAD, quick release, with stainless steel leaf spring clamp which grips a 13 mm diameter support rod. When the spring clamp is held under finger pressure its grip is released and the position of the bosshead on the support rod may easily be altered. The bosshead accepts SM-600, SM-668 to SM-695, SM-710, SM-720 and any 6 to 8 mm dia. rod at right angles to the support rod, secured by a single socket-head grub screw.
Ten **£11·00** Each **£1·25** c

ACCESSORY

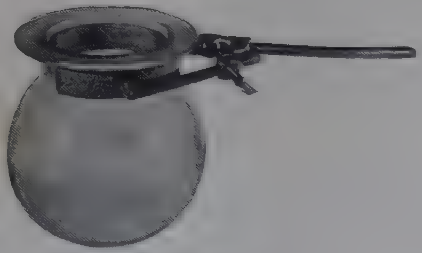
SM-488 **Wrench,** for socket-head grub screw. For price see entry in List No. sequence.


SM-640

CLAMPS

SM-640

CLAMP, for beakers up to 5 litres, cadmium plated malleable iron, with asbestos covered rod type jaws, opening up to 17 cm max. The 9·5 mm dia. horizontal support rod is offset so that large vessels are secured in line with the axis of the vertical support rod.
Each **£2·25** c


SM-645

SM-645

CLAMP, for *Quickfit* **reaction vessels** having wide necks and flat flange joints. The cadmium plated malleable iron clamp has asbestos fabric covered jaws and is supplied with two interchangeable offset support rods. One rod is used with vessels up to 5 litres and the other with 10 and 20 litre reaction vessels. The 9·5 mm dia. rods are secured by socket headed cap screws for which a wrench is provided ... ... Each **£2·25** c

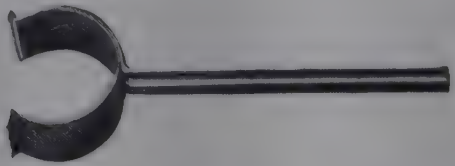
SM-668

SM-668

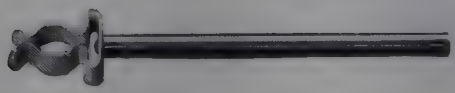
CLAMP, SEMI-MICRO, stainless steel, with three-pronged rubber sleeved jaws, and 6 mm diameter rod. The sliding hinge permits the clamp to grip apparatus up to 40 mm diameter ... Ten **£19·50** Each **£2·20** c

For spring pattern Semi-Micro Clamp see SM-685 in List No. sequence.

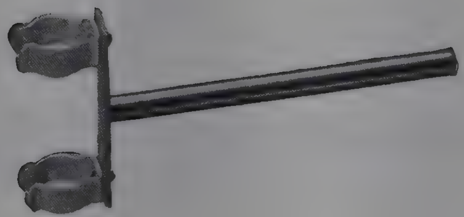
All items on this page normally available from stock.



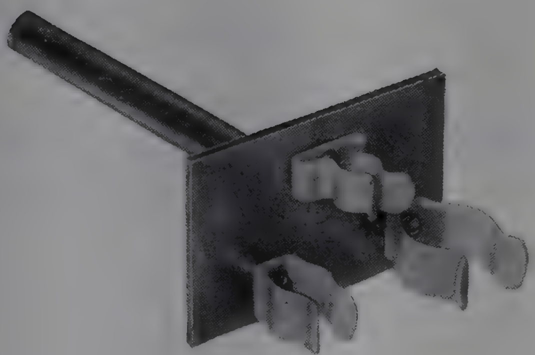
SM-670



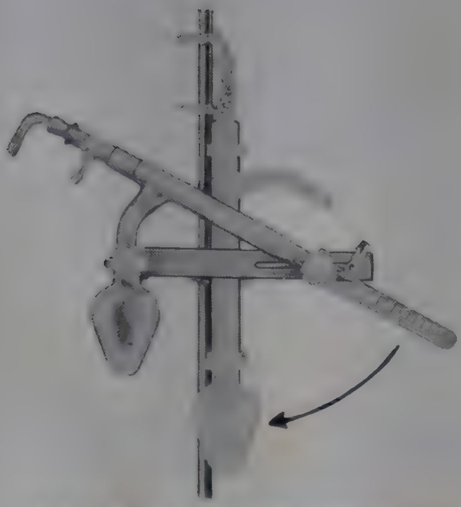
SM-680



SM-682



SM-683



SM-685 in use illustrating how a reflux assembly can be rotated and quickly re-arranged for distillation

CLAMPS

(continued)

SM-670

CLAMPS, SPRING, for supporting condensers etc., with 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.

Clamp diameter	20	35	40 mm	
Ten	**£2·60**	**2·95**	**2·95**	c
Each	**£0·32**	**0·36**	**0·36**	

SM-680

CLAMPS, SPRING, for supporting semi-micro apparatus and glass tubing. Comprises polythene coated spring clip attached to 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.

Clip size	7	13	20 mm	
Ten	**£1·70**	**1·80**	**1·90**	c
Each	**£0·24**	**0·25**	**0·26**	

SM-682

CLAMPS, SPRING, for supporting burettes. Comprises two polythene coated spring clips 5 cm apart on a plate attached to a 15 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.

Clip size	6	10	13 mm	
For burettes	1 and 2	5 and 10	5 and 50 cm^3	
Ten	**£3·30**	**3·60**	**3·80**	c
Each	**£0·39**	**0·42**	**0·44**	

SM-683

CLAMP, SPRING, for supporting two electrodes and a thermometer or other groups of similar glass apparatus of small diameters. Comprises one each polythene coated spring clips, 6, 10 and 13 mm diameter mounted 15 mm apart on a plate attached to a rod 15 cm long, 8 mm dia., to fit bossheads SM-610, SM-636 and SM-638.

Ten **£4·70** Each **£0·52** c

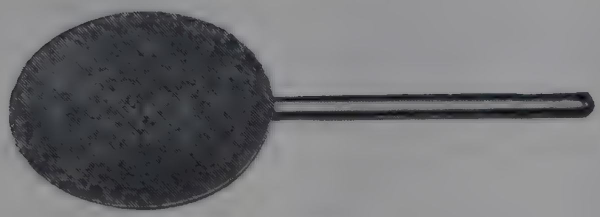
SM-685

CLAMP, SEMI-MICRO, designed by J. C. Spiring, Patent No. 1070015. A simple but versatile clamp for supporting assemblies made from small scale preparative set DT-760 and similar apparatus. Comprises a slotted bar 17 cm long with 8 mm dia. rod for mounting in bossheads SM-610, SM-636 and SM-638. The assemblies are held in two spring clips; both clips can be rotated and one can slide to vary the distance between them from 8·5 to 15 cm. The clamp can be held vertical or horizontal or at any oblique angle. Supports a variety of glass assemblies easily and securely with consequent saving of time and reduction in breakages.

Ten **£8·80** Each **£0·98** c

All items on this page normally available from stock.

PLATES



SM-695
SM-705

SM-695

SUPPORT PLATE, diameter 7·5 cm, with 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638 ... Ten **£3·30** Each **£0·39** c

SM-705

SUPPORT PLATE, diameter 10 cm, with 12·5 cm long rod, 11 mm diameter, for use with bossheads SM-480, SM-610 and SM-630 ... Ten **£6·00** Each **£0·66** c

RINGS

SM-710

SM-710

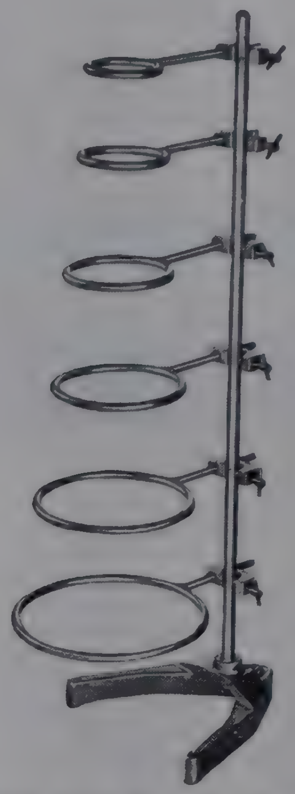
SUPPORT RING, open, vinyl coated, internal diameter 25 mm, with 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.
Ten **£3·40** Each **£0·40** c

SM-720

SM-720

RINGS, retort stand, of dull plated mild steel 8 mm rod with welded joint and plain stem. The sizes are chosen from the R10 series of preferred numbers in BS 2045 so that each step represents an increase in diameter of approx. 25%. To fit bossheads SM-610, SM-636 and SM-638.

Internal dia.	5	6·3	8	10	12·5	16 cm	
Stem length	14	13	12·5	11·5	10	9 cm	
Ten	**£2·50**	**2·60**	**2·80**	**2·90**	**3·20**	**3·50**	c
Each	**£0·31**	**0·32**	**0·34**	**0·35**	**0·38**	**0·41**	



SM-720 with SM-635 on stand

ASBESTOS YARN

for wrapping retort stand rings
Diameters 4·5 and 6 mm
For prices see AR-540 in List No. sequence.

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

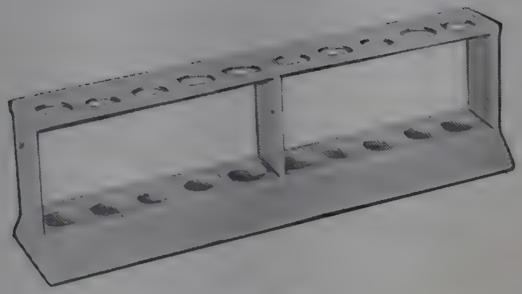
All items on this page normally available from stock.

TEST TUBE STANDS

SM-824

STANDS, TEST TUBE, hardwood of good quality finish, with or without draining pegs.

List No.	No. of holes 20 mm dia.	No. of holes 32 mm dia.	No. of pegs	Ten	Each	
				£	£	
SM-822	10	2	—	4·50	0·50	c
SM-824	5	1	6	4·00	0·46	c
SM-826	10	2	12	6·00	0·68	c
SM-828	—	6	—	3·70	0·43	c



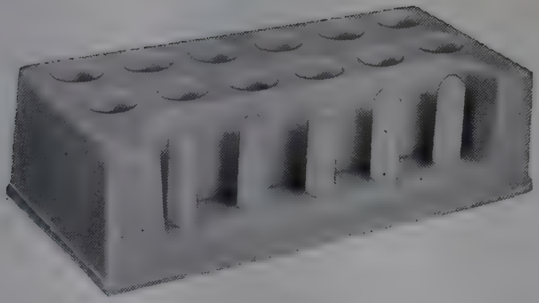
SM-865

***SM-865**

STAND, TEST TUBE, rigid polythene, with ten 19 mm diameter holes Ten **£5·90** Each **£0·66** *m*

***SM-872**

STAND, TEST TUBE, rigid polythene, with twelve 20 mm ($\frac{3}{4}$ in) diameter holes in two rows, and five 11 mm ($\frac{7}{16}$ in) diameter draining pegs ... ... Each **£1·05** *m*



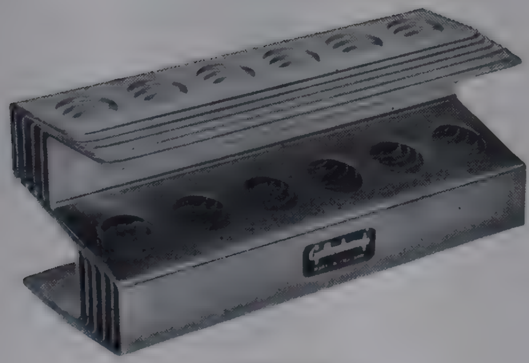
SM-872

SM-880

STAND, TEST TUBE, stainless steel. A design which can be nested for economical storage. Tough and resilient construction from one piece of stainless steel. With 6 holes 20 mm diameter in one row. Ten **£9·00** Each **£1·00** c

SM-885

STAND, TEST TUBE, stainless steel. Nesting pattern as SM-880 but with 12 holes 20 mm diameter in two rows ... ... Ten **£11·60** Each **£1·30** c



6 × SM-880
nested for storage

Stands for certain sizes of tubes will also be found in List No. sequence as follows:

CX-480	Rack for 48 culture tubes, 16 mm dia.
ME-482	Rack for 30 Kahn or culture tubes, 12 mm dia.
WF-385 to **WF-393**	Range of water bath racks to hold 12 to 25 mm dia. tubes.

All items on this page normally available from stock.

TRIPOD STANDS

SM-910

STANDS, TRIPOD, cast iron, with triangular top and splayed steel legs. Overall height 20 cm.

Length of side	12·5	15 cm	
Ten	**£3·30**	**4·10**	c
Each	**£0·39**	**0·46**	

SM-915

STANDS, TRIPOD, cast iron, with circular top and splayed steel legs.

Overall height	20	25 cm	
Top diameter	12·5	20 cm	
Ten	**£4·30**	**7·40**	c
Each	**£0·48**	**0·82**	

For suitable **Gauzes** see GK-100 and GK-105 in List No. sequence.

For suitable **Wire Triangles** see TV-540 to TV-570 in List No. sequence.

SM-910

SM-915

Gallenkamp

OVEN and INCUBATOR STANDS

- **Rigid steel construction**
- **Provide comfortable working height**

For details and prices see OV-480 to OV-484 in List No. sequence.

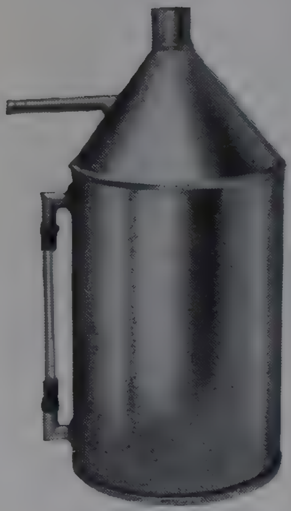
STEAM GENERATOR

SP-430

STEAM GENERATOR, copper, with all joints brazed. With outlet tube and glass gauge tube.

Dimensions, approx.	
Overall	30 cm high × 15 cm dia.
Neck	25 mm int. dia.
Outlet tube	8 mm ext. dia.
Capacity	4 litres

Each **£10·50** c



SP-430

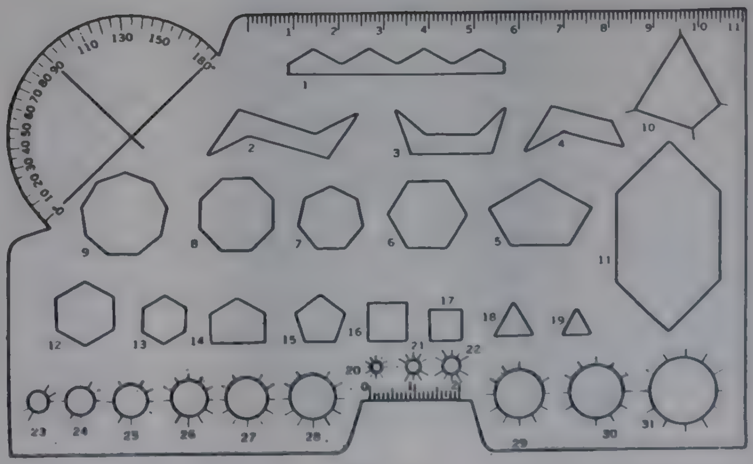
STENCIL

***SP-960**

STENCIL, organic and structural chemical, for the clear and rapid drawing of all common notations for cyclic and polynuclear compounds. Facilities are provided for three-dimensional representation of molecules which exhibit stereochemical and isomeric properties, also for molecular orbital and valence bonded models.

A protractor and a millimetre scale are provided for use with the cut-outs to establish the spatial arrangement of atoms within the molecule. Atoms are represented by a series of circular holes marked with radial lines to indicate common bond angles. Supplied complete with detailed instruction booklet. This stencil is recommended for use in conjunction with molecular model sets MV-800 to MV-815. Size approx. 16 × 10 cm.

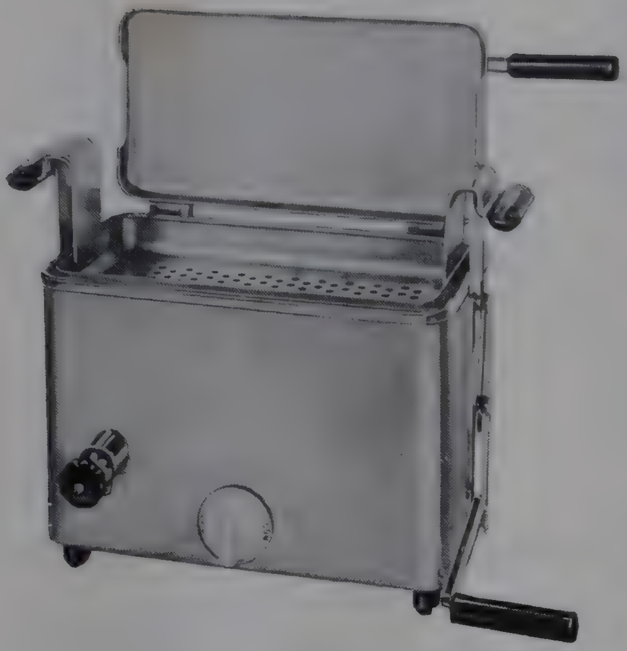
Ten **£6·00** Each **£0·68** *m*



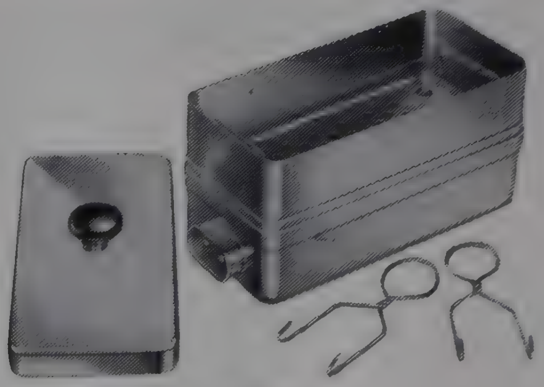
SP-960

All items on this page normally available from stock.

STEAM AND HOT AIR STERILIZERS



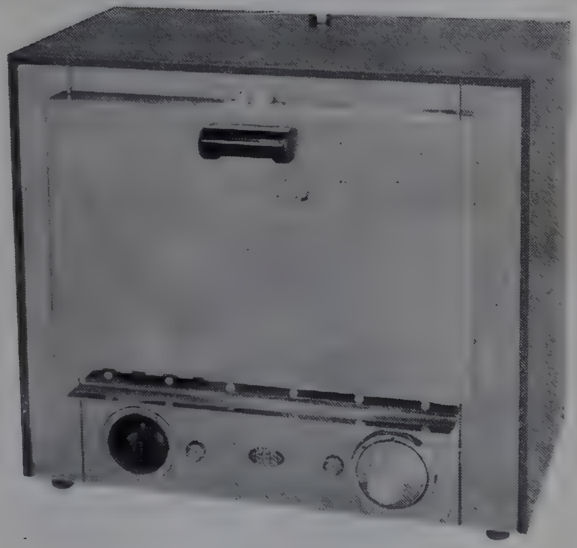
SR-632



SR-600

SR-600

STERILIZER, STEAM, electrically heated, for sterilizing small surgical instruments. Includes automatic safety cut-out to operate if the bath boils dry. With a removable perforated tray, tray lifters and cover. Boiler dimensions 19×8·5×5 cm; overall dimensions 20×9×10 cm. Heater rating 300W. For 230/250V a.c. supplies only ... ... Each **£12·85** *m*



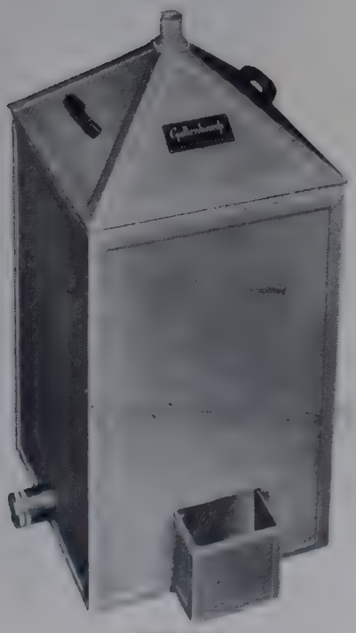
SR-654

SR-632

STERILIZER, STEAM, automatic electric, for surgical and dental instruments. Fitted with 3-heat switch control and automatic safety cut-out to prevent damage in the event of boiling dry. Seamless chromium plated boiler with screw-down draw-off tap, hinged lid and robust, lever operated tray lifting mechanism. All handles are heat insulated. The lid closes into a drip channel to prevent water dripping down outside. Boiler dimensions 35×16×12·5 cm; overall dimensions 46×17×22 cm. Heater rating 1200W. For 230/250V a.c. supplies only ... ... Each **£56·20** *f*

SR-654

STERILIZER, HOT AIR, electrically heated with automatic thermostatic control in the range 100° to 200°C. For dry sterilization of small surgical instruments placed in 3 removable sliding trays. The thermostat control knob and a timer range 0 to 120 min are mounted on the control panel. Two pilot lights indicate mains connection and thermostat operation. A hole for insertion of a mercury in glass thermometer is provided. Internal dimensions 30×17×20 cm; overall dimensions 42×28×37 cm; weight 12 kg. Heater rating 1000W. For 220/240V a.c. supplies. **With three removable trays but without thermometer** ... ... Each **£44·75** *mN*



SR-720

SR-720

STERILIZER, STEAM, Koch, square pattern, electrically heated. The internal surfaces and two removable perforated shelves are of tinned copper while the external surfaces and cover are constructed from copper and hardboard finished in grey duotone stoved enamel. Heated by double loop tubular immersion heater with connector which is ejected automatically if the chamber boils dry. With filling trough and mounted on four feet. The cover is fitted with lifting handles and a thermometer tubulure. Overall dimensions 71×36×38 cm. Heater rating 1500W. For 220/240V a.c. supplies. Each **£56·00** *m*

When ordering STERILIZERS please state voltage and frequency of supply.

Items on this page normally available from stock except those coded *N.*

OV-010 HOTBOX OVEN/STERILIZER
A robust, high performance, economically priced oven with large and especially wide shelf area to accommodate pipette sterilizing boxes.

Gallenkamp OVENS

FOR HOT AIR STERILIZING

The following *Gallenkamp* laboratory ovens are frequently used as hot air sterilizers. Full specifications and details may be found under OVENS.

OV-010	'Hotbox' Oven/Sterilizers.
OV-060	Economy Oven.
OV-160 **OV-330**	BS Ovens.
OV-420	Large capacity Oven/Sterilizer.

See also *Gallenkamp* electric, gas and steam **AUTOCLAVES.**

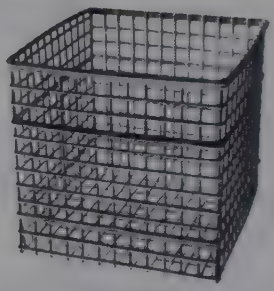
STERILIZING ACCESSORIES

FOR STEAM STERILIZING AT TEMPERATURES UP TO 120°C

SR-760

STERILIZING BASKETS, steel wire nylon coated, for test tubes.

Dimensions	10×10×10	15×15×15	20×20×20 cm	
Each	**£1·15**	**1·30**	**1·65**	c



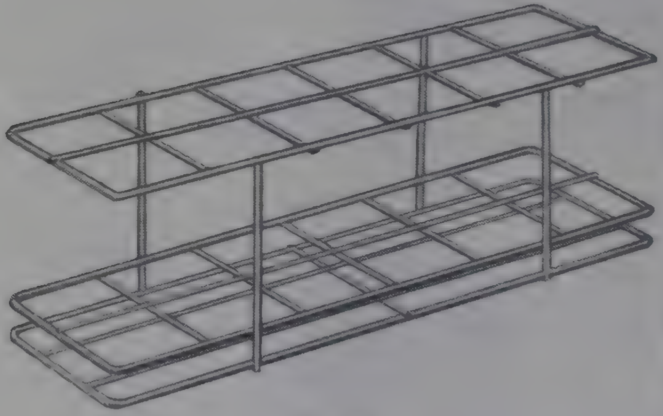
SR-760

SR-772

STERILIZING RACK, steel wire nylon coated, to hold twelve McCartney bottles CX-210 or CX-215 or universal containers CX-220. Overall dimensions 22×7×8 cm ... ... Ten **£9·00** Each **£1·00** c

SR-780

STERILIZING CONTAINER, polypropylene. Oval cross section container with perforated lid, suitable for small articles such as forceps and scissors up to 19 cm in length. Internal cross section 63×34 mm.
Ten **£3·30** Each **£0·39** c



SR-772

SR-780

FOR STEAM AND HOT AIR STERILIZING AT HIGHER TEMPERATURES

SR-800

STERILIZING BOXES, stainless steel, for pipettes, with close fitting lid.

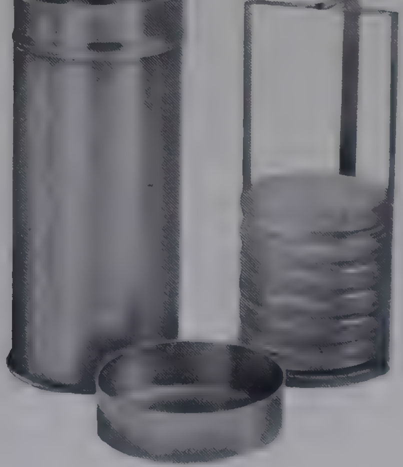
Length	38	45 cm	
Diameter	6·5	6·5 cm	
Each	**£2·60**	**3·10**	c

SR-820

STERILIZING BOX, stainless steel, for 10 cm diameter Petri dishes, with lifting rack. Length 26 cm, diameter 12 cm ... ... Each **£5·00** c

Dishes—see DM-240 et seq. in List No. sequence.
'Sterile' labels—see LB-150 in List No. sequence.
Trays—see TU-515 et seq. in List No. sequence.

SR-800

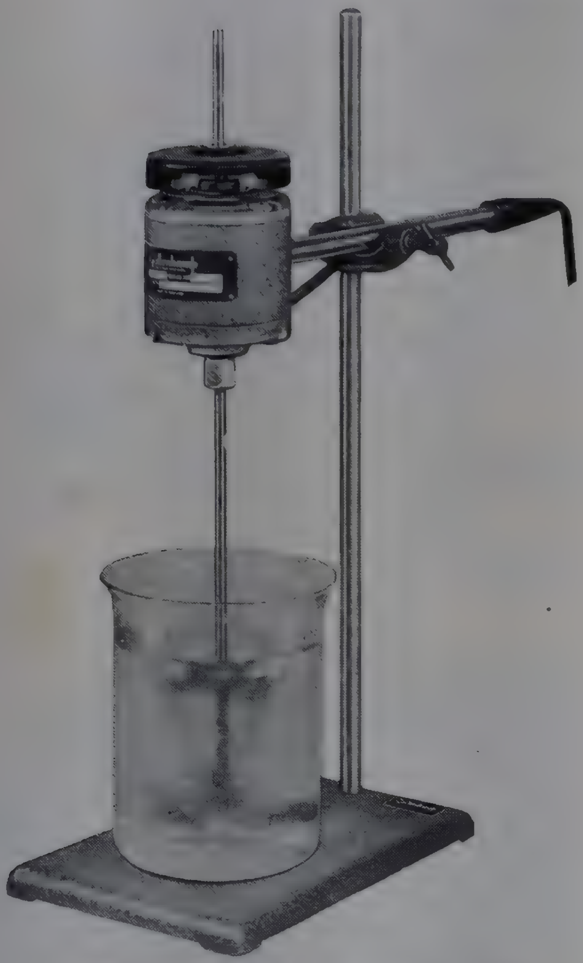


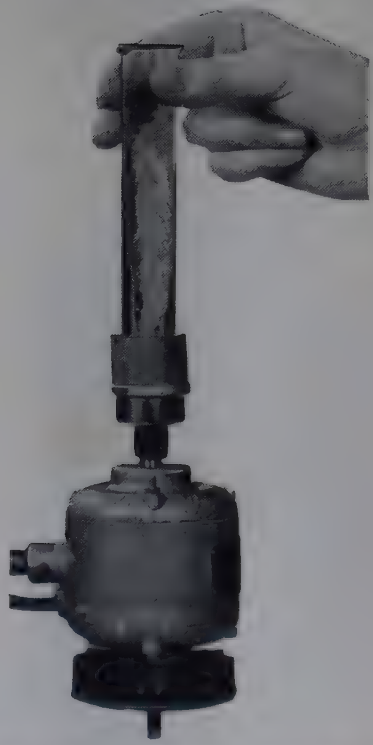
SR-820

All items on this page normally available from stock.

Gallenkamp HANDILAB STIRRER

THE VERSATILE STIRRER WITH PUSH-FIT ACCESSORIES


SS-425 with rotor, beaker and stand


SS-425 with orbital mixer **SS-450** stirring contents of a test tube

SPEED OF ROTATION 1200 rev/min approximately

QUIET FAN COOLED INDUCTION MOTOR WITH HOLLOW SHAFT WHICH FACILITATES:

- Rapid push-in fitting of accessories
- Accurate adjustment of stirrer height or immersion depth
- Quick raising of stirrer for removal of beaker or container
- Fitting accessories from either end of the shaft
- Clockwise or counterclockwise rotation

ACCESSORIES INCLUDE:

- Stirrer paddles in polythene or stainless steel
- Orbital mixer for speedy mixing of test tube contents
- Magnetic head for remote stirring in closed vessels
- Chuck for 6·35 mm ($\frac{1}{4}$ in) diameter fittings
- Pulley for belt driving stirrers, etc.
- Stirrer with low friction vacuum tight gland in standard interchangeable joint
- Speed control rheostat

SS-425

STIRRER, Handilab, *Gallenkamp*, as specification with motor of 1 kgf cm torque.

Motor dimensions	150 × 75 mm dia.
Mounting rod dimensions	200 × 13 mm dia.
Weight, net	2·2 kg

With length of 3-core flexible cable.

Without accessories.

For 220/240V 50 Hz single phase supplies.	Each	£9·00	*b*
For 200/210V 50 Hz single phase supplies.	Each	£9·50	*b*
For 110/120V 60 Hz single phase supplies.	Each	£9·50	*b*

When ordering please state voltage and frequency of supply.

All items on this page normally available from stock.

Gallenkamp HANDILAB STIRRER

SS-426

STIRRER KIT, Handilab, *Gallenkamp*, comprising hollow shaft stirrer SS-425, stainless steel rotor SS-430, polythene rotor SS-440, magnetic stirring rotor SS-444, set of magnetised followers SS-626, pulley SS-460, chuck SS-455 and glass stirrer SS-550.

For 220/240V 50 Hz single phase supplies. Each **£17·00** *b*

For 200/210V 50 Hz single phase supplies. Each **£17·50** *b*

For 110/120V 60 Hz single phase supplies. Each **£17·50** *b*

When ordering please state voltage and frequency of supply

Suitable lubricant for motor bearings see LX-110 in List No sequence.

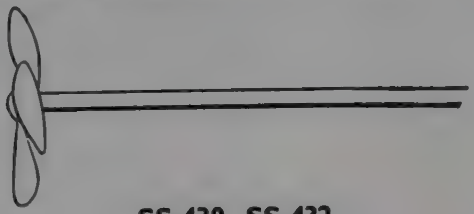
ACCESSORIES

SS-427

RHEOSTAT, rotary, fully enclosed, for bench or wall mounting, giving speed control of stirrer SS-425. With length of 3-core cable, plug and socket connector. Each **£9·00** *b*

When ordering please state voltage of motor for which rheostat is required.

ROTORS TO FIT HOLLOW SHAFT OF HANDILAB STIRRER



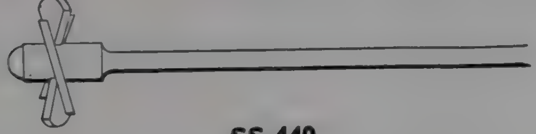
SS-430, SS-432

SS-430

ROTOR, stainless steel, with 38 cm shaft and 4-bladed 4·5 cm impeller ... ... Ten **£8·40** Each **£0·94** *b*

SS-432

ROTOR, stainless steel, with 38 cm shaft and 4-bladed 5·7 cm impeller ... ... Ten **£8·60** Each **£0·96** *b*



SS-440

SS-440

ROTOR, polythene, with 38 cm steel reinforced shaft and 4-bladed 4·5 cm impeller. Ten **£5·60** Each **£0·62** c

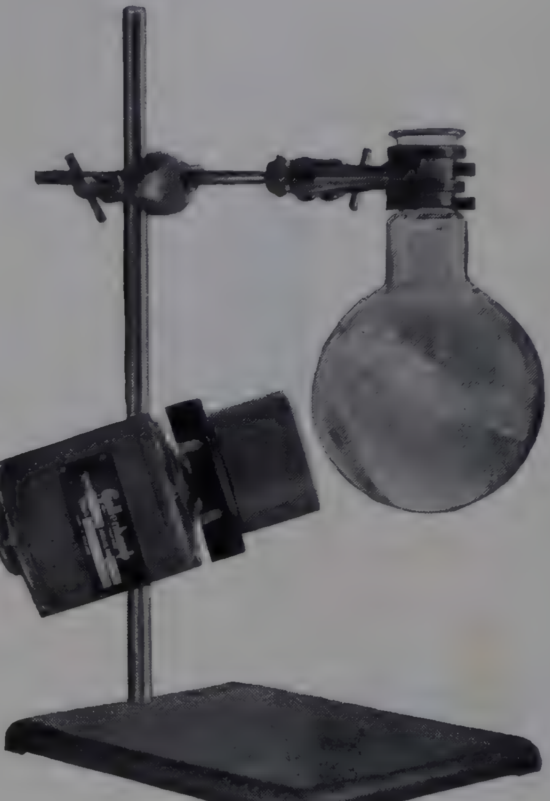
SS-444

ROTOR, magnetic, with 18 cm stainless steel shaft and powerful U-shape magnet enclosed in 6 cm diameter cover ... ... Ten **£19·00** Each **£2·10** *b*

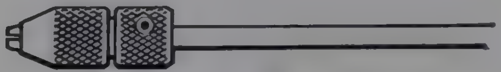
SS-450

ORBITAL MIXER, for producing a vigorous vortex mixing action in the contents of test tubes and small containers. The mixer comprises a rubber cup mounted eccentrically on a ball race on a stainless steel rod which fits the hollow shaft of the stirrer. In use, the test tube is held in the hand and the bottom of the tube is pressed into contact with the rubber cup. The two then orbit smoothly in contact until the tube is withdrawn. There is no need to stop the motor for this purpose. Each **£1·75** *b*

For illustration see opposite page.



SS-425 with magnetic rotor SS-444 and follower, stirring the contents of a flask

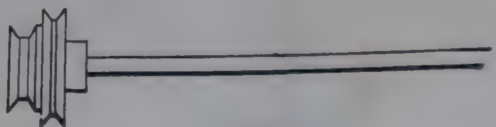


SS-455

SS-455

CHUCK, 6·35 mm (¼ in) with 20 cm stainless steel shaft, to convert hollow shaft motor for conventional fixed length rotors ... ... Ten **£9·20** Each **£1·02** *b*

For rotors to fit chuck, see SS-544 to SS-556 in List No. sequence.



SS-460

SS-460

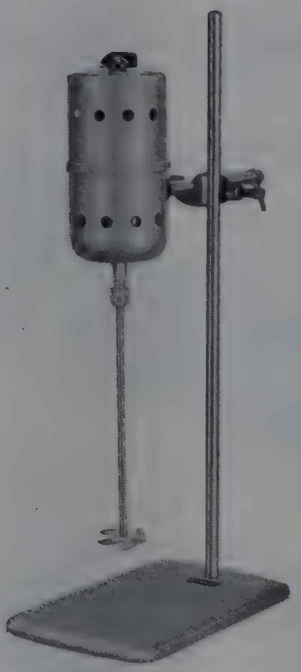
PULLEY, 2-step, 2·5 and 3·75 cm diameter with 20 cm stainless steel shaft ... Ten **£12·00** Each **£1·35** *b*

Pulley driven ROTOR, for 24/29 standard socket, see SS-570 in List No. sequence.

All items on this page normally available from stock.

Gallenkamp VARIABLE SPEED STIRRERS

TWO MODELS WITH TEN-STEP SPEED CONTROLS AND CHUCKS
TO ACCEPT 6·35 mm (¼ in) DIA. ACCESSORIES



SS-530 with SS-544
on stand

DIRECT DRIVE MODEL

- **Up to 2500 rev/min**
- **For light duty stirring of low viscosity liquids**
- **Suitable for a.c. or d.c. supplies**
- **13 mm stainless steel support tube encloses the supply cable**

SS-530

STIRRER, *Gallenkamp*, **variable speed,** fully enclosed with built-in rotary rheostat controlling the speed in ten fixed steps up to 2500 rev/min. Fitted with a chuck to accept stirring rotors having 6·35 mm diameter shafts.

Motor dimensions	180×100 mm dia.
Weight, net	1·4 kg

For a.c. or d.c. supplies. **Without accessories.**

For 220/240V	... ...	Each	**£17·00**	*b*
For 200/210V	... ...	Each	**£17·50**	*bN*
For 110/120V	... ...	Each	**£17·50**	*bN*

SS-535

STIRRER KIT, *Gallenkamp*, **variable speed,** comprising stirrer SS-530, stainless steel rotor SS-544, glass rotor SS-550, polythene rotor SS-552 and pulley SS-556.

For 220/240V	... ...	Each	**£19·50**	*b*
For 200/210V	... ...	Each	**£20·00**	*bN*
For 110/120V	... ...	Each	**£20·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

SS-536	**Brushes, for motor**	Pair	**£0·30**	*b*
SS-538	**Spare chuck**	Each	**£0·60**	*b*

SS-540
with accessories on stand

GEARED DRIVE MODEL

- **60 to 600 and 400 to 4000 rev/min**
- **Maximum torque 2·5 kgf cm**
- **13 mm stainless steel support tube encloses the supply cable**

SS-540

STIRRER, *Gallenkamp*, **variable speed, geared.** The speed of the motor is controlled in ten steps by a separate control unit incorporating a choke transformer connected to the motor by a 6 ft length of cable. A chuck which accepts 6·35 mm diameter stirrers or other accessories may be fitted either to the shaft at one end of the motor, for speeds up to 4000 rev/min or to the gearbox output shaft for speeds up to 600 rev/min.

Motor dimensions	180×110 mm dia.
Control unit dimensions	110×90×50 mm
Weight, net	3·5 kg

For a.c. single phase supplies only. **Without accessories.**

For 220/240V	... ...	Each	**£24·00**	*g*
For 200/210V	... ...	Each	**£26·00**	*gN*
For 110/120V	... ...	Each	**£26·00**	*gN*

When ordering please state voltage and frequency of supply.

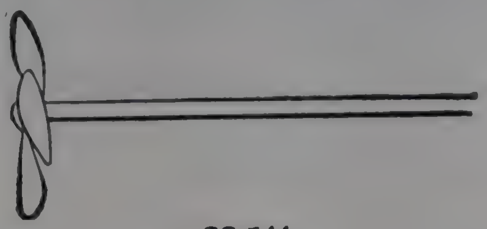
REPLACEMENT PARTS

SS-542	**Brushes, for motor**	Pair	**£0·20**	*b*
SS-538	**Spare chuck. For price see entry in List No. sequence.**			

Items on this page normally available from stock except those coded *N*.

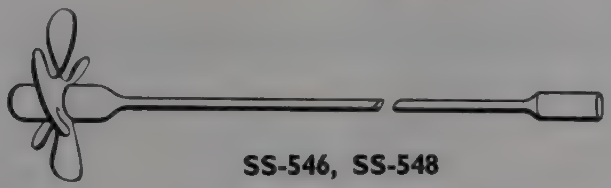
Gallenkamp STIRRER ACCESSORIES

ROTORS to fit 6·35 mm (¼ in) chucks.



SS-544

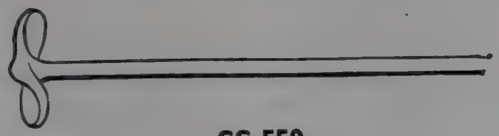
SS-544
ROTOR, stainless steel, with 20 cm shaft and 4-bladed 4·5 cm impeller ... ... Ten **£7·00** Each **£0·78** *b*



SS-546, SS-548

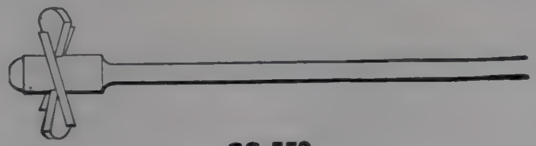
SS-546
ROTOR, stainless steel, with 25 cm flexible shaft and 4-bladed 4·5 cm self-aligning impeller.
Ten **£18·00** Each **£2·00** *b*

SS-548
ROTOR, stainless steel, with 46 cm flexible shaft and 4-bladed 5·7 cm self-aligning impeller.
Ten **£19·00** Each **£2·10** *b*



SS-550

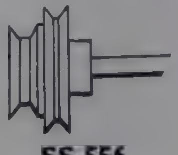
SS-550
ROTOR, glass, with 20 cm shaft ground to fit chuck and 2-bladed 3 cm impeller ... Ten **£4·60** Each **£0·51** *a*



SS-552

SS-552
ROTOR, polythene, with 20 cm steel reinforced shaft and 4-bladed 4·5 cm impeller.
Ten **£5·70** Each **£0·64** *b*

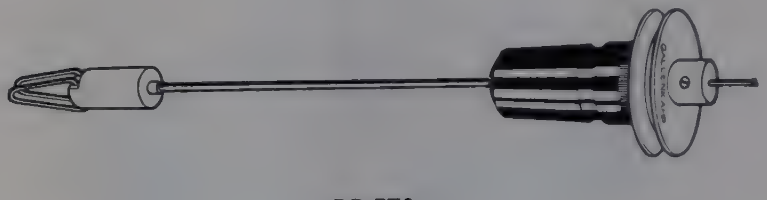
SS-554
FLEXIBLE DRIVE, enclosed in armoured covering, 46 cm long and bored at driving end to accept 6·35 mm stirrer shaft ... ... Ten **£30·00** Each **£3·40** *b*



SS-556

SS-556
PULLEY, 2-step, 2·5 and 3·75 cm dia. with 7·5 cm stainless steel shaft ... Ten **£9·00** Each **£1·00** *b*

ACCESSORY
MX-720 **Driving belts.** For details and prices see entry in List No. sequence.



SS-570

SS-570
STIRRER, *Gallenkamp,* **standard joint, vacuum pattern,** comprising a hard plastics adapter, cone size 24/29, fitted internally with a ball-bearing on which the driving pulley rotates. The latter accepts the thin stainless steel stirrer shaft whose flexibility provides exceptionally vibrationless operation. A vacuum tight stuffing box is fitted and only makes contact with the thin stirrer shaft so that friction is negligible even under vacuum. The stirrer shaft, overall length 33 cm, is adjustable for working depth and is fitted with a stainless steel collapsable link rotor which has an extended diameter of 6·5 cm. Can be driven by any *Gallenkamp* stirrer fitted with a pulley ... ... Each **£3·30** *b*

Gallenkamp ECONOMY MAGNETIC STIRRER

SS-590

MAGNETIC STIRRER, *Gallenkamp,* **Economy.** A simple, inexpensive magnetic stirrer with a speed of approximately 250 rev/min. Recommended for schools, colleges and laboratories where speed control is not required. Comprises a reliable, brushless motor with fan and powerful sintered disk magnet, all contained in an anodised aluminium spinning. Stirring intensity can be adjusted by using spacers under the sample container.

Supplied with 25 mm magnetic follower encased in polypropylene and mains connecting cable. Dimensions 13 cm dia. × 9·5 cm high. Weight 1 kg. For 220/240V 50 Hz single phase supplies ... ... Each **£7·00** *b*

Gallenkamp

SS-590

All items on this page normally available from stock.

Gallenkamp MAGNETIC STIRRERS

Compact variable speed stirrers, available with or without hotplate, which produce from gentle to vigorous stirring action suitable for:

- **Titrations**
- **Controlled precipitations**
- **Rapid preparation of solutions**
- **Agitation during electrochemical tests**
- **Agitation of sterile liquids**
- **Agitation within vacuum systems**

SS-610 with rod

SS-615 with rod

FEATURES

- **Continuous speed control up to 1325 rev/min**
- **Range of magnetised followers available**
- **Silent—brushless motors**
- **Controls enclosed in enamelled metal case**
- **Fixing for 13 mm dia. support rod**

OVERALL DIMENSIONS AND WEIGHTS

List No.	Dimensions, cm H W D	Weight, kg
SS-610	9·5×17·5×27	2·2
SS-615	13·5×17·5×27	3·5
SS-618	13·5×17·5×27	3·5
SS-620	13·5×52 ×27	9·0

SS-610

MAGNETIC STIRRER, *Gallenkamp,* as specification, with one each 25 and 45 mm magnetic followers encased in polypropylene. **Without support rod.**

Supply		Price	Code
For 200/240V 50 Hz single phase supplies.	Each	**£16·00**	*b*
For 110/120V 60 Hz single phase supplies.	Each	**£16·50**	*bN*

When ordering please state voltage and frequency of supply.

SS-615

MAGNETIC STIRRER/HOTPLATE, 450°C max., energy regulator control, *Gallenkamp,* as specification, with 12·5 cm dia. aluminium hotplate enclosing a sheathed 400W heater. Includes one each 25 and 45 mm magnetic followers encased in polypropylene. **Without support rod.**

Supply		Price	Code
For 200/240V 50 Hz single phase supplies.	Each	**£25·50**	*b*
For 110/120V 60 Hz single phase supplies.	Each	**£26·00**	*bN*

When ordering please state voltage and frequency of supply.

NOTE: Polypropylene has a maximum working temperature of 140°C.

REPLACEMENT PARTS

SS-617	**Hotplate, 400W**	Each	**£4·50**	c
SS-636	**Magnetic followers,** polypropylene. For prices see entry in List No. sequence.			

For other magnetic followers see SS-626 et seq. in List No. sequence.
For suitable rods see SM-450 et seq. in List No. sequence.

Items on this page normally available from stock except those coded *N*.

Gallenkamp MAGNETIC STIRRERS

SS-618

MAGNETIC STIRRER/HOTPLATE, 300°C max., thermostatic control, *Gallenkamp*, as specification, with 12·5 cm dia. aluminium hotplate enclosing a sheathed 400W heater. Includes one each 25 and 45 mm magnetic followers encased in polypropylene. **Without support rod.**

For 200/240V 50 Hz single phase supplies.	Each	**£26·00**	*b*
For 110/120V 60 Hz single phase supplies.	Each	**£26·50**	*bN*

When ordering please state voltage and frequency of supply.

NOTE: Polypropylene has a maximum working temperature of 140°C.

REPLACEMENT PARTS

SS-617	**Hotplate, 400W ... ...**	For prices see entries in List No. sequence.
SS-636	**Magnetic followers, polypropylene**	

SS-618 with rod

SS-620

MAGNETIC STIRRER/HOTPLATE, 450°C max. 3-TEST, *Gallenkamp*, as SS-615 but comprising three hotplates, three sets of controls and three each 25 and 45 mm magnetic followers encased in polypropylene. **Without support rods.**

For 200/240V 50 Hz single phase supplies.	Each	**£76·50**	*b*
For 110/120V 60 Hz single phase supplies.	Each	**£78·00**	*bN*

When ordering please state voltage and frequency of supply.

NOTE: Polypropylene has a maximum working temperature of 140°C.

REPLACEMENT PARTS

SS-617	**Hotplate, 400W ... ...**	For prices see entries in List No. sequence.
SS-636	**Magnetic followers, polypropylene.**	

For other magnetic followers see SS-626 et seq. in List No. sequence.
For suitable rods see SM-450 et seq. in List No. sequence.

SS-620

Gallenkamp
REGD. TRADE MARK

HANDILAB STIRRER
with
MAGNETIC ROTOR

see SS-425 and SS-444 in List No. sequence.

Items on this page normally available from stock except those coded *N*.

MAGNETIC STIRRER FOLLOWERS

HINTS FOR THE USE OF MAGNETIC STIRRERS and MAGNETISED FOLLOWERS

1. Different lengths of follower give widely differing stirring characteristics. Try out several sizes before deciding which one is best for any particular application.
2. Ensure that the glass or plastics coating over the follower does not react with the liquid to be stirred.
3. If the stirrer motor fails to rotate, turn the speed control up, raise the beaker for a moment or rotate the beaker through part of a turn. One of these operations usually induces the motor to start.
4. If the follower spins out of control and settles on one side of the beaker, reduce the stirring speed.
5. Where very critical stirring is required and cannot be obtained otherwise, experiments with spacers made of paper mats, glass, tiles, or copper, aluminium or iron sheet of varying thickness and placed under the beaker or flask, yield interesting and useful results.
6. In general, plain followers are less noisy and more efficient than those with centre rims.

SS-626

MAGNETISED FOLLOWER SET, comprising one each all sizes SS-630 (glass) and SS-636 (polypropylene).
Ten sets **£21·00** Set **£2·35** *c*

SS-630

MAGNETISED FOLLOWERS, encased in glass.

Length	6	13	19	25	38	50 mm	
Ten	**£1·30**	**1·40**	**1·50**	**1·60**	**1·80**	**1·90**	*c*
Each	**£0·20**	**0·21**	**0·22**	**0·23**	**0·25**	**0·26**	

SS-634

MAGNETISED FOLLOWERS, encased in ptfe.

Length	12	20	40	60 mm	
Ten	**£4·10**	**4·60**	**5·60**	**9·60**	*c*
Each	**£0·47**	**0·51**	**0·62**	**1·06**	

SS-636

MAGNETISED FOLLOWERS, encased in polypropylene.

Length	12	25	45	60 mm	
Ten	**£1·80**	**2·50**	**3·20**	**4·00**	*c*
Each	**£0·25**	**0·32**	**0·38**	**0·45**	

SS-638

MAGNETISED FOLLOWERS, as SS-636 but with centre rim.

Length	40	60 mm	
Ten	**£2·90**	**4·00**	*c*
Each	**£0·35**	**0·45**	

SS-642

RETRIEVER, for magnetic followers, comprising permanent magnet encased in glass tube 8 mm dia., 30 cm long ... ... Ten **£4·50** Each **£0·50** *b*

SS-644

RETRIEVER, as SS-642 but encased in ptfe. 10 mm dia., 35 cm long ... ... Each **£1·50** *m*

MISCELLANEOUS STIRRERS

SS-680

SS-760

SS-680

STIRRER, constant speed, with fully enclosed 1/20 hp electric motor giving an on-load speed of approximately 2,000 rev/min, particularly suitable for mixing low viscosity liquids. The telescopic hollow stainless steel shaft is locked at any length between 16 and 57 cm. An adjustable ball and socket joint enables the stirrer to be positioned as required and the mounting clamp has a maximum jaw opening of 47 mm. For 230/250V a.c. single phase supplies ... ... Each **£95·00** *fN*

When ordering please state voltage and frequency of supply.

SS-760

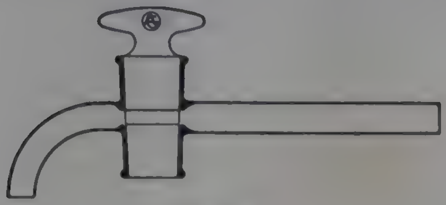
STIRRER, COMPRESSED AIR, *Turbinia*, for pressures above 1 kgf/cm² giving a speed range from 10 to 10,000 rev/min. This stirrer has a consumption of 30 l/min at 2 kgf/cm². The chuck takes stirring rotors up to 6·35 mm (¼ in) diameter. With two glass stirrers and bosshead for mounting on retort stand ... ... Each **£20·80** *f*

SEMI-MICRO STIRRER, which can be driven by **COMPRESSED AIR, VACUUM** or **WATER** see Q-MU8/0 in the *Quickfit* Section.

For high speed MIXER-EMULSIFIERS see MU-962 and MU-965 in List No. sequence.

Items on this page normally available from stock except those coded ***N.***

ASPIRATOR STOPCOCKS



ST-420

ST-420

STOPCOCKS, (AG) **aspirator, borosilicate glass** single straight bore.

Bore of key	3	5	7	10 mm	
Tube dia., approx.	8	9	11	15 mm	
Ten	£5·30	7·00	12·40	17·00	*a*
Each	£0·59	0·78	1·40	1·90	

AU-348

STOPCOCK, aspirator, borosilicate glass, suitable for 29/32 socket.

AU-367

STOPCOCK, aspirator, *Flexicon,* borosilicate glass, with two PVC rings around the joint to give a degree of flexibility. Suitable for 29/32 socket outlets.

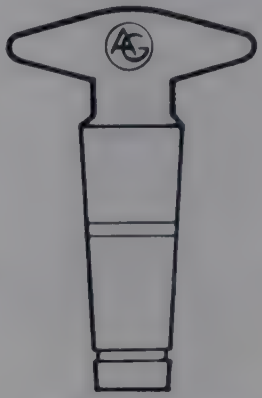
AU-447

STOPCOCK, aspirator, polythene, 12 mm bore with air vent. Suitable for 29/32 socket.

For full details and prices of above see entries in List No. sequence.

STOPCOCKS WITH INTERCHANGEABLE KEYS

These stopcocks are manufactured in accordance with the dimensions of the U.S.A. standard CS-21. The length of ground zone is 30 mm with a diameter at the bore of 12 mm. Special production techniques ensure perfection of form and complete interchangeability. All (AG) ₮ stopcocks are fitted with a rust resistant retaining spring and are listed under List Nos. ST-451, ST-453, ST-501, ST-505, ST-511 and ST-514.



ST-440 ST-442

INTERCHANGEABLE STOPCOCK KEYS

ST-440

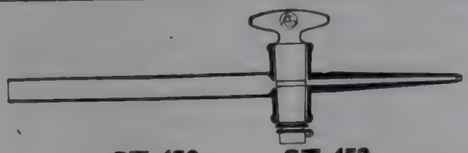
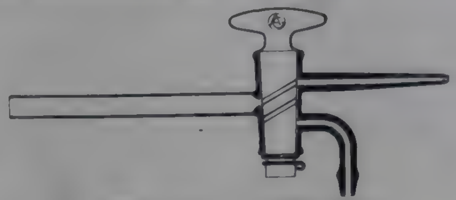
STOPCOCK KEYS, (AG), ₮ **interchangeable,** of soda-lime glass ... ... Ten **£3·00** Each **£0·36** *a*

ST-442

STOPCOCK KEYS, (AG), ₮ **interchangeable,** of borosilicate glass ... ... Ten **£3·00** Each **£0·36** *a*

BURETTE STOPCOCKS 1—2 mm BORE

with retaining springs and 9 mm o.d. side tube

PATTERN				Soda-lime glass	Borosilicate glass	
 ST-450 ST-452 ST-451 ST-453	Straight bore with capillary jet, for sealing to burettes	Individually fitted keys	Ten Each	**ST-450** £4·20 £0·47	**ST-452** £5·00 £0·56	*a*
		Interchangeable ₮ keys	Ten Each	**ST-451** £6·60 £0·74	**ST-453** £6·60 £0·74	*a*
 ST-460 ST-462	Double oblique bore with capillary jet and bent filling tube, for sealing to burettes	Individually fitted keys	Ten Each	**ST-460** £7·60 £0·86	**ST-462** £8·60 £0·96	*a*

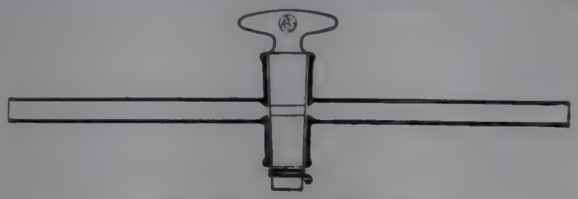
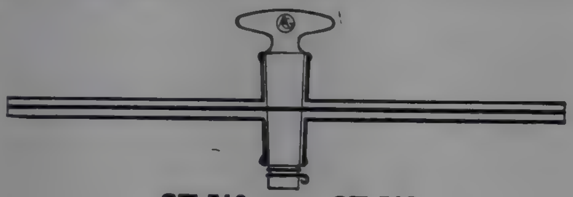
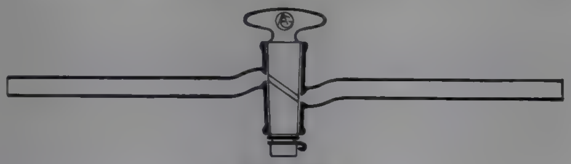
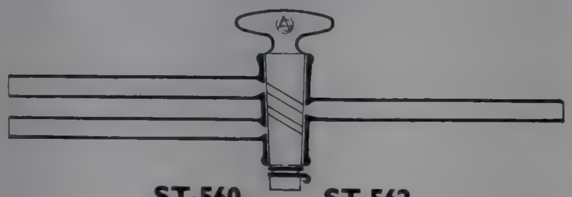
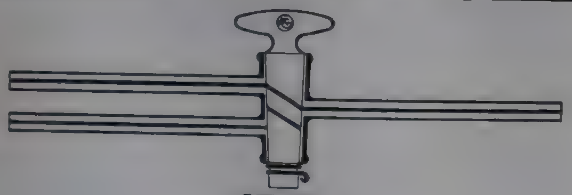
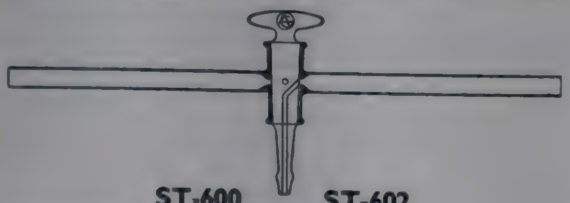
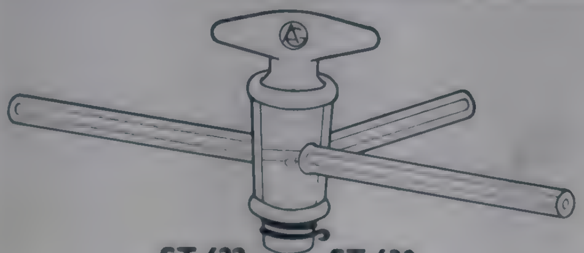
For spare ₮ keys see ST-440 and ST-442 entry above.

For spare retaining springs see ST-650 in List No. sequence.

All items on this page normally available from stock.

STOPCOCKS 1—2 mm BORE

with retaining springs and 7 mm o.d. side tubes

PATTERN				Soda-lime glass	Borosilicate glass	
 ST-500 ST-504 ST-501 ST-505	Single straight bore with wide bore side tubes	Individually fitted keys	Ten Each	ST-500 £4·00 £0·46	ST-504 £5·00 £0·55	a
		Interchangeable $ keys	Ten Each	ST-501 £6·00 £0·68	ST-505 £6·00 £0·68	a
 ST-510 ST-512 ST-511 ST-514	Single straight bore with capillary side tubes	Individually fitted keys	Ten Each	ST-510 £4·60 £0·51	ST-512 £5·30 £0·59	a
		Interchangeable $ keys	Ten Each	ST-511 £6·60 £0·74	ST-514 £6·60 £0·74	a
 ST-530	Single oblique bore with wide bore side tubes	Individually fitted keys	Ten Each	— —	ST-530 £7·00 £0·78	a
 ST-560 ST-562	Double oblique bore with wide bore side tubes	Individually fitted keys	Ten Each	ST-560 £8·80 £0·98	ST-562 £10·40 £1·16	a
 ST-570	Double oblique bore with capillary side tubes	Individually fitted keys	Ten Each	— —	ST-570 £10·80 £1·20	a
 ST-600 ST-602	Straight bore with second bore to connect either side tube to tail. **Without retaining spring**	Individually fitted keys	Ten Each	ST-600 £8·80 £0·98	ST-602 £9·60 £1·08	a
 ST-622 ST-630	T-bore with wide bore side tubes and third side tube perpendicular to the other two	Individually fitted keys	Ten Each	ST-620 £6·60 £0·74	— —	a
	T-bore as ST-620 but with capillary side tubes	Individually fitted keys	Ten Each	ST-622 £7·00 £0·78	ST-630 £7·00 £0·78	a

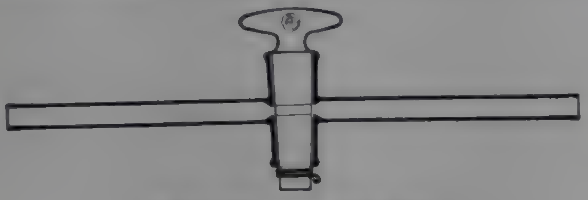
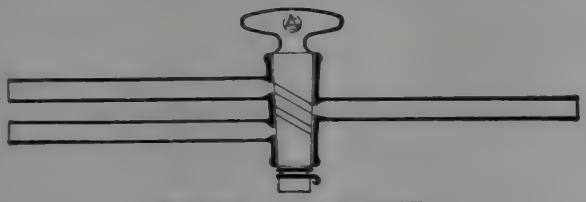
For spare $ keys see ST-440 and ST-442 in List No. sequence.

For spare retaining springs see ST-650 in List No. sequence.

All items on this page normally available from stock.

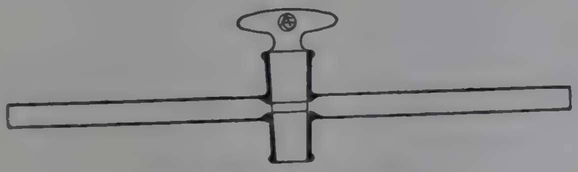
STOPCOCKS 3—4 mm BORE

with retaining springs, 9 mm o.d. side tubes and individually fitted keys

PATTERN			Soda-lime glass	Borosilicate glass	
	Single straight bore with wide bore side tubes		ST-632	ST-633	
		Ten	£4·60	£6·20	*a*
		Each	£0·51	£0·70	
	Double oblique bore with wide bore side tubes		ST-636	ST-637	
		Ten	£9·20	£11·00	*a*
		Each	£1·02	£1·25	

STOPCOCKS 5—11 mm BORE

with individually fitted keys

PATTERN				Soda-lime glass	Borosilicate glass	
	Single straight bore with wide bore side tubes			ST-645	ST-646	
		5–6 mm bore	Ten	£6·60	£7·60	*a*
		10 mm o.d. side tube	Each	£0·74	£0·84	
		7–8 mm bore	Ten	£9·60	£14·60	*a*
		12 mm o.d. side tube	Each	£1·08	£1·65	
		10–11 mm bore	Ten	£15·00	£17·50	*a*
		16 mm o.d. side tube	Each	£1·70	£1·95	

FV-765 Globe valves, suitable for air, water, oil and steam.

FV-825 Gas stopcocks.

For details and prices see entries in List No. sequence.

STOPCOCK RETAINING SPRINGS

ST-650
STOPCOCK RETAINING SPRINGS, rust resistant, as fitted to AG stopcocks. In pack of 10.

10 packs	£1·60	Pack	£0·23	*b*

All items on this page normally available from stock.

PLASTICS STOPCOCK

ST-740

ST-740

STOPCOCK, nylon, with 8 mm inlet tube at right angles to 6 mm outlet tube ... ... Each **£0·50** *m*

SOLENOID VALVE

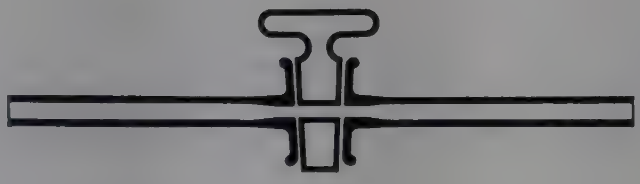
SOLENOID VALVE TYPE
No
INLET

ST-760

ST-760

VALVE, solenoid, electrically operated, for ON/OFF control of flow of liquids at pressures up to 5 lbf/in² (0·35 kgf/cm²). A packless, **normally closed** type suitable for temperatures up to 37°C. The robust valve body and all functional parts are of PVC and ptfe making it suitable for handling a wide range of acids, alkalis, inorganic and organic chemicals and biological fluids. Polypropylene inlet and outlet nozzles, suitable for 12·7 mm bore flexible tubing, are provided. Surge current 1·75A; running current 0·23A. Overall dimensions excluding nozzles 11 cm high × 6 cm dia. For 220/240V 50 Hz single phase supplies ... Each **£15·00** *m*

VACUUM STOPCOCKS

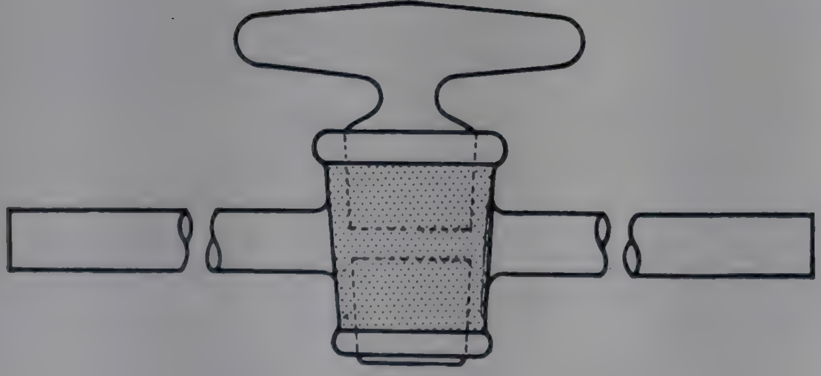


ST-780

ST-780

STOPCOCKS, vacuum, *Pyrex brand* **glass,** single straight bore, with sealed hollow plug.

Bore of key	2	4	6	8	10 mm	
Std. pack. qty.	4	4	4	4	4	
Std. pack	£6·90	7·15	7·50	10·30	11·60	*d*
Each	£1·80	1·90	2·00	2·75	3·10	

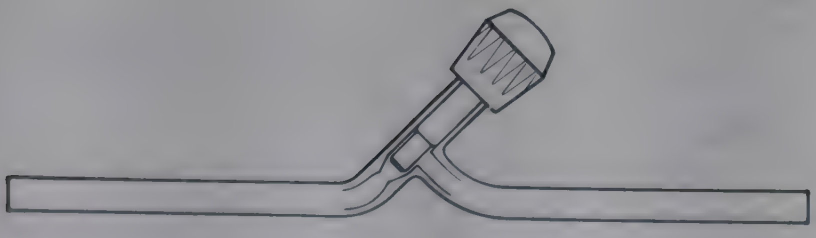


ST-800

ST-800

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** single straight bore with two side tubes.

Ref. No.	TH1C/1	TH1/3	TH1/6	TH1/8		
Bore of key	1	3	6	8	mm	
Bore of side tube	2	4	7	10	mm	
Ten	£13·50	14·00	19·00	24·50		*m*
Each	£ 1·50	1·55	2·10	2·75		



ST-805

ST-805

STOPCOCKS, vacuum, *Quickfit Rotaflo,* **borosilicate glass** with internal screw action ptfe plug key. Single bore with two side tubes.

Ref. No.	TF2/C1/13	TF2/13	TF2/18	TF2/24	
Bore of key	2	3	6	10 mm	
Bore of side tube	2	5	7	10 mm	
Ten	£25·00	24·00	28·00	33·00	*m*
Each	£ 2·75	2·70	3·10	3·70	

REPLACEMENT PART

ST-807 **Plug key, ptfe.**

Ref. No.	TP1/13	TP1/18	TP1/24	
For key bore	2 and 3	6	10 mm	
Ten	£10·50	15·00	18·50	*m*
Each	£1·16	1·65	2·10	

VB-770 Vacuum needle valve.

For details and price see entry in List No. sequence.

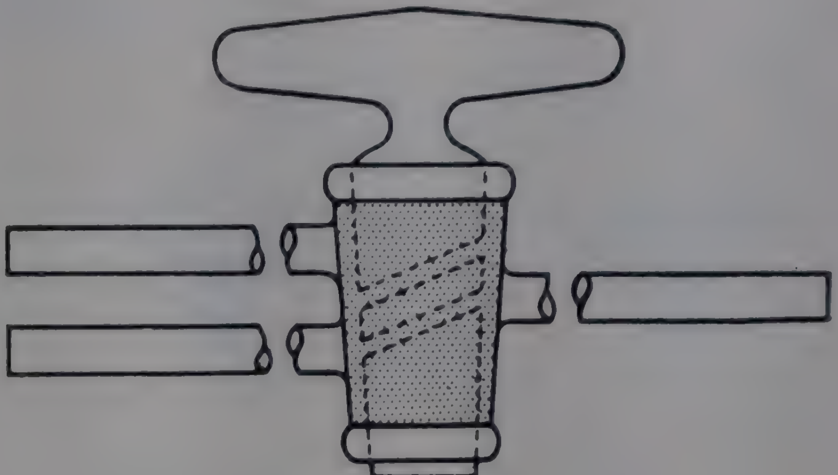
All items on this page normally available from stock.

VACUUM STOPCOCKS
(continued)

ST-830

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** double oblique bore with three side tubes.

Ref. No.	TH3/1	TH3/3	
Bore of key	1	3	mm
Bore of side tube	2	4	mm
Ten	**£21·00**	**22·50**	*m*
Each	**£ 2·35**	**2·50**	

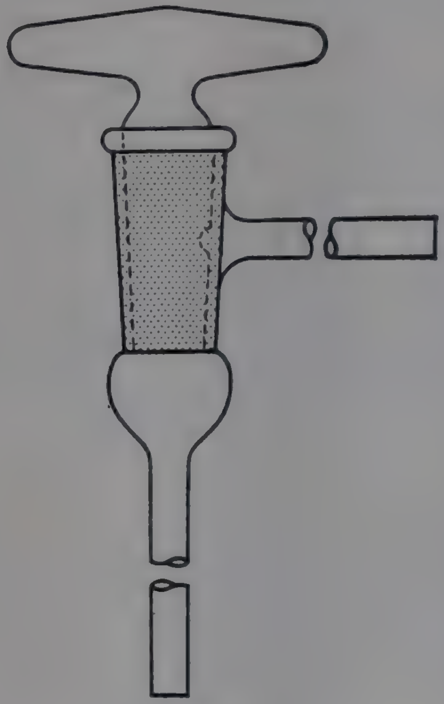

ST-830

Quickfit **stopcock adapters** see QUICKFIT APPARATUS.

ST-840

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** L-shape with side and tail tubes.

Ref. No.	TH6/3	TH6/6	TH6/8	
Bore of key	3	6	8 mm	
Bore of side tube	4	7	10 mm	
Ten	**£19·50**	**21·00**	**24·50**	*m*
Each	**£ 2·15**	**2·35**	**2·75**	


ST-840

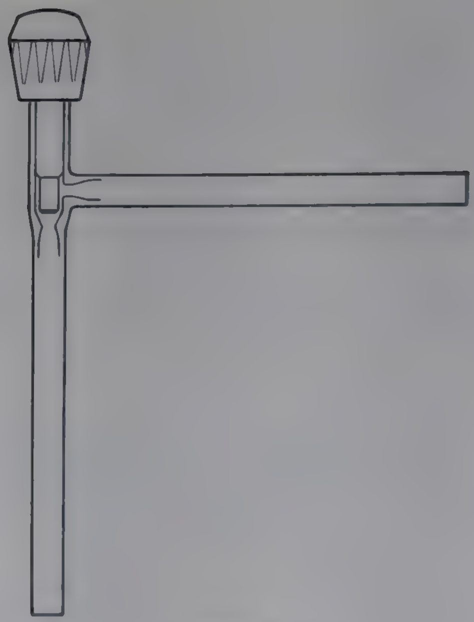
ST-845

STOPCOCKS, vacuum, *Quickfit Rotaflo,* **borosilicate glass** with internal, screw action ptfe plug key. Single bore L-shape with side and tail tubes.

Ref. No.	TF6/13	TF6/18	TF6/24	
Bore of key	3	6	10 mm	
Bore of side and tail tubes	5	7	10 mm	
Ten	**£24·00**	**28·00**	**34·50**	*m*
Each	**£ 2·70**	**3·10**	**3·80**	

REPLACEMENT PART

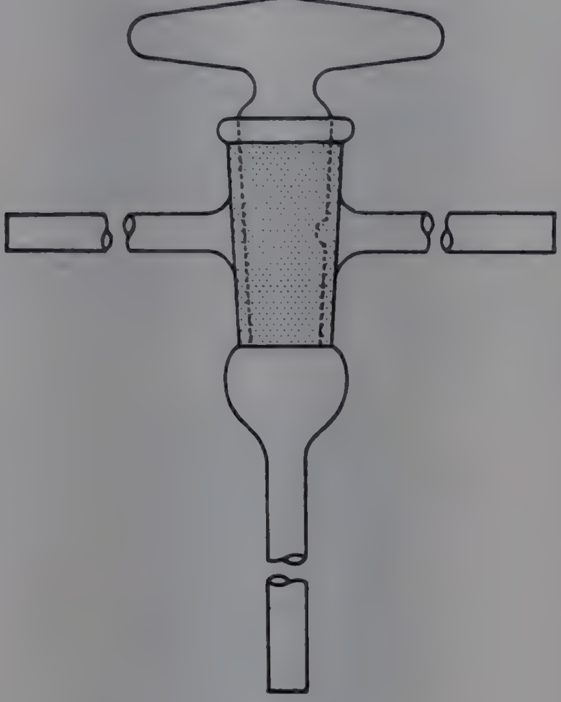
ST-807 **Plug key,** ptfe. For details and prices see entry in List No. sequence.


ST-845

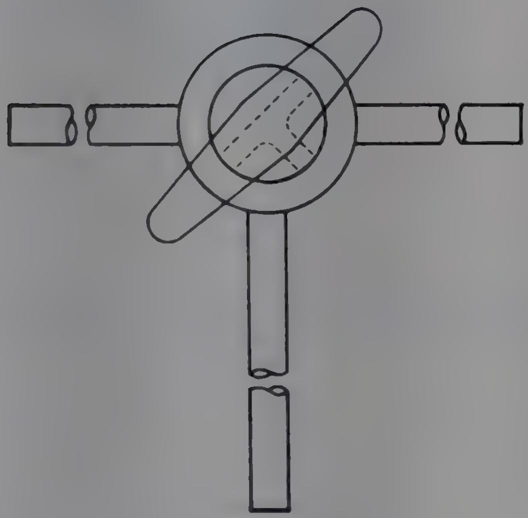
DIAPHRAGM CONTROL VALVES
for vacuum and pressure

Bench and pipe mounting see FV-741 et seq. in List No. sequence.

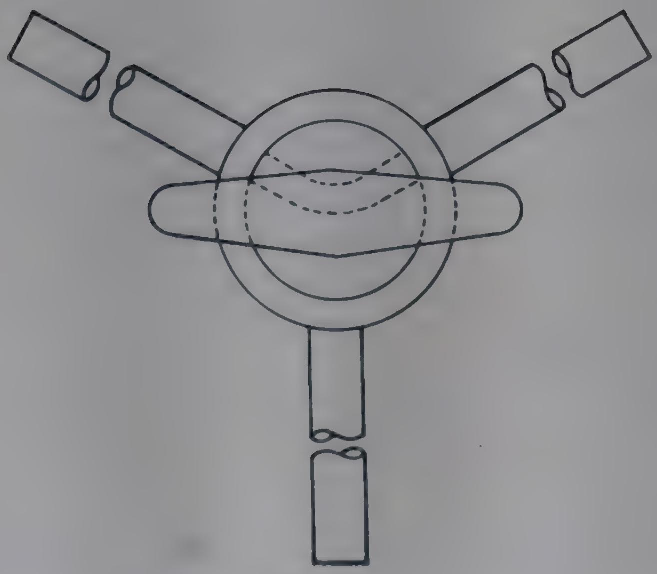
All items on this page normally available from stock.



ST-860



ST-870



ST-880

ST-860

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** L-shape, with tail and two side tubes.

Ref. No.	TH8/2	TH8/6	TH8/8	
Bore of key	3	6	8 mm	
Bore of side tube	4	7	10 mm	
Ten	**£20·00**	**23·00**	**27·00**	*m*
Each	**£ 2·20**	**2·55**	**3·00**	

ST-870

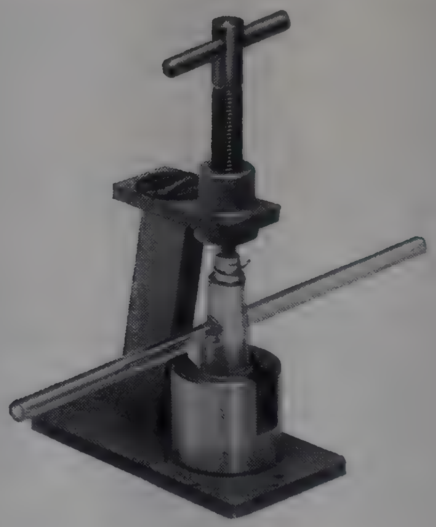
STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** T-bore, with three side tubes.

Ref. No.	TH4/3	TH4/6	
Bore of key	3	6 mm	
Bore of side tube	4	7 mm	
Ten	**£22·50**	**30·00**	*m*
Each	**£2·50**	**3·30**	

ST-880

STOPCOCK, vacuum, *Quickfit* TH5/3, **borosilicate glass,** V-bore, with three side tubes. Bore of key 3 mm, bore of side tubes 4 mm ... Ten **£22·50** Each **£2·50** *m*

STOPCOCK KEY REMOVER



ST-970

ST-970

STOPCOCK KEY REMOVER, for removing jammed stopcock keys from laboratory glassware. Comprises a strong steel frame with a steel screw and an aluminium block which is recessed to take the handle of the stopcock key. The block is tapered to accept stopcock barrels of different diameters. By exerting a steady pressure with the screw, the key may be removed ... Each **£4·70** *c*

STOPCOCK LUBRICANTS

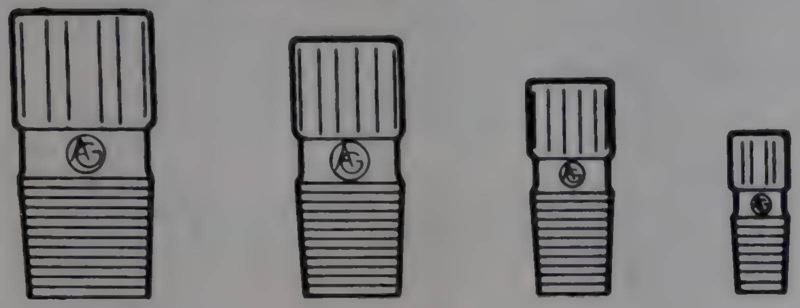
LX-210 **LX-220**	**Rubber greases.**
LX-235	**Silicone grease.**
LX-245	**Ptfe dry film.**
VB-880 et seq.	**Apiezon greases.**

For full details of applications see entries in List No. sequence.

All items on this page normally available from stock.

STOPPERS

GLASS STOPPERS



SU-520

SU-520

STOPPERS, (AG), **borosilicate glass,** to BS 572, with fluted hexagonal head, suitable for *Technico* volumetric cylinders and flasks and (AG) separating funnels.

Size	10/13	12/14	14/15	16/16	
To fit cylinders	5/10	—	25/50	— ml	
To fit flasks	1 to 50	100	200/250	500 ml	
To fit sep. funnels	—	—	25	— ml	
Ten	£1·25	1·30	1·45	1·45	*a*
Each	£0·19	0·20	0·21	0·21	

Size	19/17	24/20	29/22	
To fit cylinders	100	250/500	— ml	
To fit flasks	1000	2000	— ml	
To fit sep. funnels	50/100	250/500	1000 ml	
Ten	£1·60	1·80	2·20	*a*
Each	£0·23	0·25	0·28	

STOPPERS, glass, to BS 572 see also *Quickfit* **apparatus.**

CORK STOPPERS see CV-010 and CV-015

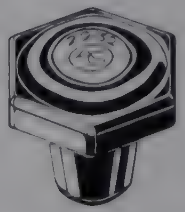
IODINE FLASK STOPPERS
see *Quickfit* Apparatus

SEALING MATERIALS

Silicone rubber	see PP-495
Parafilm	see PP-522 and PP-524
Ptfe tape	see PP-525

For details and prices see entries in List No. sequence.

PLASTICS STOPPERS



SU-700, SU-710, SU-712

SU-718

SU-700

STOPPERS, (AG), **polypropylene,** to BS 572 closed at lower end, with dustproof hexagonal head. Coloured red with grey disk insert. Suitable for *Technico* volumetric cylinders and flasks and (AG) separating funnels. These stoppers can be sterilised. Supplied in packs of 6 stoppers of 1 size.

Size	10/13	12/14	14/15	
To fit cylinders	5/10	—	25/50 ml	
To fit flasks	1 to 50	100	200/250 ml	
To fit sep. funnels	—	—	25 ml	
10 packs	£2·50	2·70	2·80	*b*
Pack	£0·32	0·33	0·34	

Size	16/16	19/17	24/20	
To fit cylinders	—	100	250/500 ml	
To fit flasks	500	1000	2000 ml	
To fit sep. funnels	—	50/100	250/500 ml	
10 packs	£2·80	3·30	3·50	*b*
Pack	£0·34	0·39	0·41	

SU-710

STOPPERS, (AG), **polypropylene,** to BS 572, with dustproof hexagonal head and closed lower end. Coloured red with grey disk insert. These stoppers can be sterilised and are suitable for reagent bottles BT-140, BT-142, BT-400, BT-402 and other apparatus with corresponding joint sizes. Supplied in packs of 6 stoppers of 1 size.

Size	19/22	24/29	29/32	
10 packs	£3·00	3·30	4·00	*b*
Pack	£0·36	0·39	0·45	

SU-712

STOPPERS, (AG), **polypropylene,** to BS 572 as SU-710 but in other colours suitable for colour coding. Available in white, yellow, green or blue, all with grey disk insert. Supplied in packs of 4 stoppers of 1 size, all the same colour or 1 each of 4 colours.

Size	19/22	24/29	29/32	
10 packs	£2·50	2·80	3·00	*b*
Pack	£0·31	0·34	0·36	

When ordering please state whether single colour or mixture is required.

***SU-718**

STOPPERS, polypropylene, with hexagonal head having two 8 mm dia. nozzles for connection to flexible tubing. One nozzle is fitted with an 8 mm dia. tube which extends for approx. 10 mm below the hollow cone.

Size	29/32	34/35	
Ten	£2·00	2·30	*m*
Each	£0·26	0·29	

All items on this page normally available from stock.

RUBBER STOPPERS

A range of rubber stoppers to the requirements of BS 2775. Each stopper is numbered with the diameter of the small end in mm, which corresponds to the stopper size number. Numbers 3 to 29 have a taper of 1 in 8, numbers 31 to 71 a taper of 1 in 7 and numbers 75 to 105 a taper of 1 in 5·5.

SU-760

STOPPERS, solid, natural red rubber, hardness 41–50 BS degrees, covering complete range of sizes. **For prices see facing page.**

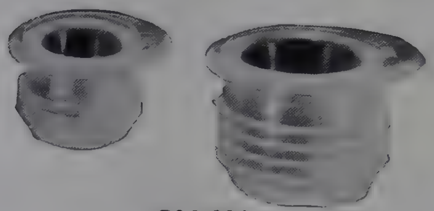
SU-762

STOPPERS, rubber, solid. Stoppers SU-760 in pack of 9 dozen assorted sizes from 5 mm to 25 mm as follows:
- 12 each, size Nos 9, 10, 11, 13.
- 8 each, size Nos 7, 8, 15.
- 6 each, size Nos 5, 6, 17, 19.
- 4 each, size Nos 21, 23, 25.

10 packs **£18·00** Pack **£2·00** c

Gallenkamp
RUBBER STOPPERS to BS 2775
List No. SU-760
Type SOLID
Quantity 12
Size 19
LONDON—WIDNES—STOCKTON-ON-TEES
MADE IN ENGLAND

SU-760



SU-820

SU-850

SU-765

STOPPERS, one hole, natural red rubber, hardness 41–50 BS degrees. Size range Nos. 5 to 43.

Hole diameter; 3 mm for sizes 5 and 6
4 mm for sizes 7 and 8
5 mm for sizes 9 to 43

SU-780

STOPPERS, solid grey synthetic rubber (neoprene), free from sulphur, hardness 41–50 BS degrees. Size range 3 to 43.

SU-800

STOPPERS, solid, silicone rubber, hardness 50–75 BS degrees, non-toxic, translucent, will withstand repeated sterilisation and storage in tropical conditions. Size range 3 to 33.

For prices of SU-765, SU-780 and SU-800 see facing page.

For details of the properties of natural, synthetic (neoprene) and silicone rubbers see data on page 764.

BORING HOLES IN RUBBER STOPPERS

Stoppers SU-760, SU-780 and SU-800 can be supplied to order with holes bored to customer requirements. The price quoted below is additional to the cost of the stoppers and the dozen rate applies only to 12 or more stoppers bored with the same size of hole.

12 holes **£0·50** Each hole **£0·13** *cN*

BORERS for rubber stoppers—see CV-100 et seq. in List No. sequence.

SUBA-SEAL RUBBER STOPPERS

SU-820

STOPPERS, *Suba-seal,* **recessed top, silicone rubber,** non-toxic, translucent. Suitable for closing tubes and will withstand repeated sterilisation and storage in tropical conditions. With serrations to grip the sides of the tube and a lip to assist removal. The top can be pierced by a hypodermic needle. In packs of 10.

Size No.	15	20	30	36	51	70	
Diameter	8·7	10·7	15	17	23	35·6 mm	
10 packs	**£4·20**	**4·70**	**6·80**	**7·00**	**16·50**	**23·50**	c
Pack	**£0·47**	**0·52**	**0·76**	**0·78**	**1·80**	**2·60**	

SU-850

STOPPERS, *Suba-seal,* **rubber,** solid, for narrow mouth containers, with turnover flange and suction serrations. In packs of 10.

Size No.	9	13	17	21	
Bottom diameter	6·5	8	9·5	11 mm	
10 packs	**£1·75**	**1·85**	**2·05**	**2·30**	c
Pack	**£0·24**	**0·25**	**0·27**	**0·29**	

Size No.	25	29	33	37	
Bottom diameter	12·5	14	16	17·5 mm	
10 packs	**£2·50**	**2·60**	**2·90**	**4·40**	c
Pack	**£0·31**	**0·33**	**0·35**	**0·49**	

Size No.	41	45	49	
Bottom diameter	19	20·5	22 mm	
10 packs	**£5·00**	**5·80**	**8·20**	c
Pack	**£0·55**	**0·64**	**0·90**	

Items on this page normally available from stock except those coded *N.*

RUBBER STOPPERS

DIMENSIONS AND PRICES

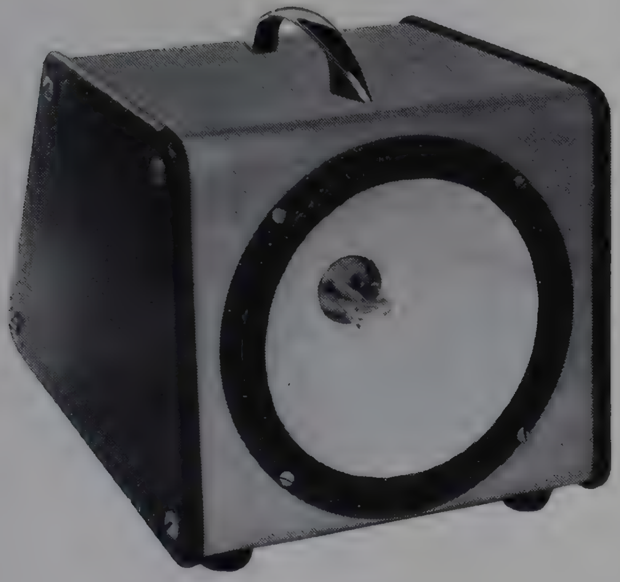
When ordering please state List No. and stopper Size No.

Stopper Size No.	Dimensions			SU-760		SU-780		SU-800	
	Bottom dia. mm	Top dia. mm	Height mm	10 packs	Pack of 12	10 packs	Pack of 12	10 packs	Pack of 12
				£	£	£	£	£	£
3	3	4·5	12	1·00	0·17	1·20	0·19	3·90	0·45
4	4	5·8	14	1·00	0·17	1·20	0·19	3·90	0·45
				SU-760 and SU-765					
5	5	7	16	1·00	0·17	1·20	0·19	3·90	0·45
6	6	8	16	1·00	0·17	1·30	0·20	4·40	0·49
7	7	9	16	1·10	0·18	1·40	0·21	5·50	0·62
8	8	10·5	20	1·10	0·18	1·40	0·21	8·20	0·92
9	9	11·5	20	1·20	0·19	1·50	0·22	9·60	1·08
10	10	12·5	20	1·30	0·20	1·60	0·23	11·80	1·35
11	11	14	24	1·40	0·21	1·70	0·24	19·00	2·15
13	13	16	24	1·50	0·22	1·80	0·25	22·00	2·45
								Twelve	Each
								£	£
15	15	18	24	1·60	0·23	1·90	0·26	2·80	0·30
17	17	20·3	26	1·90	0·25	2·40	0·31	4·40	0·43
19	19	22·5	28	2·30	0·29	2·70	0·33	5·20	0·49
21	21	24·5	28	3·00	0·36	3·50	0·41	5·70	0·53
23	23	26·5	28	3·30	0·39	4·00	0·46	6·60	0·62
25	25	28·5	28	4·10	0·46	4·90	0·55	7·60	0·72
27	27	31	32	5·10	0·57	5·90	0·66	10·20	0·96
29	29	33	32	6·00	0·68	7·00	0·78	11·20	1·06
31	31	36	35	9·00	1·00	10·40	1·16	15·50	1·45
33	33	38·5	38·5	9·80	1·10	11·40	1·30	17·50	1·65
35	35	40·5	38·5	11·00	1·25	12·40	1·40		
37	37	42·5	38·5	12·00	1·35	12·80	1·45		
39	39	44·5	38·5	13·00	1·45	14·60	1·65		
41	41	47	42	13·60	1·50	16·00	1·80		
43	43	49	42	15·00	1·70	18·00	2·00		
				SU-760					
				Twelve	Each				
				£	£				
45	45	51	42	1·70	0·21				
49	49	55	42	2·00	0·23				
53	53	59·5	45·5	2·50	0·27				
57	57	64	49	3·10	0·33				
62	62	69	49	4·10	0·40				
67	67	74	49	5·00	0·47				
71	71	78	49	5·60	0·52				
75	75	85	54	8·20	0·78				
79	79	89	54	8·80	0·82				
86	86	96	54	9·80	0·92				
92	92	102	54	11·60	1·08				
99	99	109	54	12·60	1·18				
105	105	116·5	63·5	14·00	1·30				

All items on this page normally available from stock (code *c*).

STROBOSCOPE

SV-800 front



SV-800 rear

SV-800

STROBOSCOPE, *Flash-Tac*, a low priced portable instrument **fitted with a Xenon flash tube** giving 100 to 15,000 flashes/minute in three ranges. Flash duration 1 to 20 μs, and light intensity 50 to 100 lux depending upon range.
Flash speeds are indicated on a directly calibrated scale accurate to within ± 3%. External triggering facilities are provided. The flash tube and 12 cm reflector are at the rear of the instrument.
Dimensions 25 x 20 x 18 cm. Weight 3 kg.
For 200/250V 50 Hz single phase supplies.
Each **£45·00** *f*

TB-020

TACHOMETER, range 0 to 50,000 rev/min. For details and price see entry in List No. sequence.

STOPWATCHES	see Timers
STRIP ACTION WATER STILL	see Distillation
STRIP CHART RECORDER	see Electrical Instruments
STUDENT BALANCES	see Balances
SUBLIMATION APPARATUS	see Microchemistry
SUGAR FLASKS	see Flasks
SULPHONATION FLASK	see Petroleum
SULPHUR OXIDES GAS ANALYSER	see Gas Analysers
SUPPORT FRAMES	see Stands and Clamps

SURFACE TENSION AND INTERFACIAL TENSION BALANCE

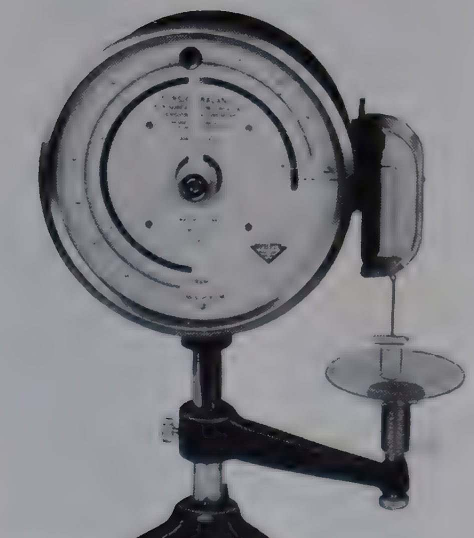
For rapid direct reading determinations using either the ring or the glass plate test methods.

Construction

The balance is for 4 cm circumference rings and 4 cm edge glass plates and is scaled 0 to 0·12 Newtons/metre in 12 divisions and 0 to 1 g in 500 divisions. Scale accuracy is ±0·4%. The balance has polished hardened steel pivots mounted in spring loaded jewelled bearings. Eddy current damping brings the pointer rapidly to rest. A quick action locking device enables the beam to be clamped regardless of pointer position and so can save time by avoiding having to return to zero between consecutive determinations. The balance is fitted with zero adjuster, spirit level and levelling feet. The construction allows the apparatus also to be used as an ordinary 1 g balance.

Operation

The liquid under examination is placed in a dish on a small platform supported by an arm extending from the balance column. Coarse adjustment is by the screw clamping this arm and fine adjustment by another screw beneath the platform. The platinum wire ring or glass test plate is suspended from the balance hook through a small hole in the transparent cover which protects the balance arm.
The ring or plate is brought into contact with the liquid and, as it is gradually drawn away from the surface, the force resulting from surface tension may be read directly from the balance scale.



SX-530

SX-530

SURFACE AND INTERFACIAL TENSION BALANCE, as specification, including platinum ring and glass test plate each with a weight-compensating extension hook, concave dish, two glass beakers and instructions manual ... ... Each **£81·90** *m*

REPLACEMENT PART

SX-534 Platinum ring ... ... Each **£7·25** *m*

All items on this page normally available from stock.

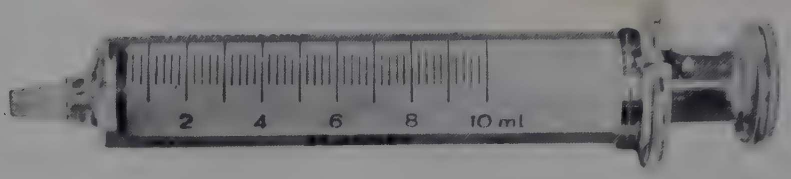
SYRINGES

ALL SYRINGES FOR INTERCHANGEABLE NEEDLES ARE LUER FITTING

***SY-410**

SYRINGES, all glass, for liquids. Made from heat resisting glass with calibrations widely spaced and indelibly marked. Pistons and barrels from any one size are interchangeable. **Without needle,** accepts any Luer fitting needle.

Capacity	1	2	5	10	20 ml	
Subdivision	0·1	0·2	0·2	0·2	1·0 ml	
Ten	**£3·00**	**3·00**	**4·80**	**6·50**	**8·60**	c
Each	**£0·36**	**0·36**	**0·53**	**0·72**	**0·96**	

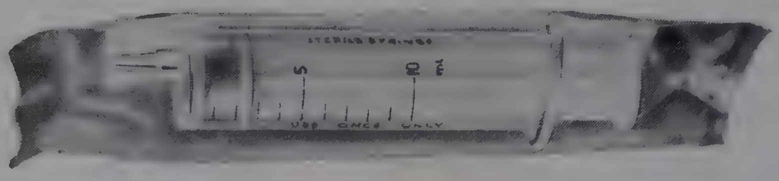


SY-410

SY-430

SYRINGES, plastics, disposable, for gases or liquids, radiation sterilised. With barrel and plunger of polystyrene and sealing piston of surgical rubber coated with inert silicone lubricant. Each syringe is separately packed in a sealed polythene envelope. The 1 ml size is the tuberculin type, the others to BS 1263. **Without needle,** accepts any Luer fitting needle. Supplied in packs of 25.

Capacity	1	2	5	10 ml	
Subdivided	0·01	0·2	0·5	1 ml	
4 packs	**£4·00**	**2·40**	**3·80**	**4·80**	c
Pack	**£1·06**	**0·64**	**1·02**	**1·30**	

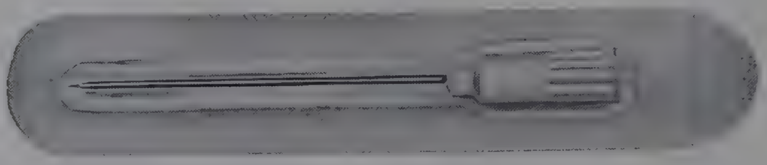


SY-430

SY-432

SYRINGE NEEDLES, disposable, stainless steel with polystyrene Luer connection, radiation sterilised. Each needle separately packed with plastics protecting sheath in a sealed polythene envelope. Supplied in packs of 25.

Size No.	Hypo 20	15	1	Serum II	
Gauge	25	23	21	19	
Length	16	25	38	51 mm	
4 packs	**£1·65**	**1·65**	**1·65**	**2·35**	c
Pack	**£0·45**	**0·45**	**0·45**	**0·62**	



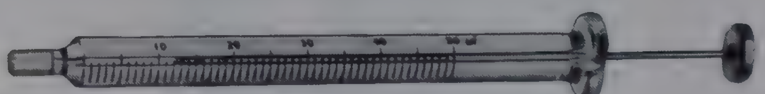
SY-432

SYRINGES, Agla pipette **SYRINGE SAFETY PIPETTES**	} see	PIPETTES
SYRINGE NEEDLES, long	see	CL-945 in List No. sequence.
SYRINGE, gas sampling	see	GF-415 in List No. sequence.

MICRO SYRINGES

***SY-500**

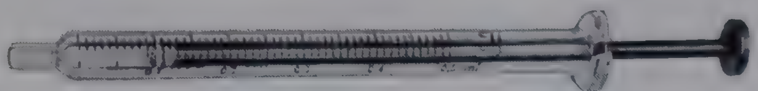
SYRINGE, 50 µl, glass and stainless steel, for liquids. With heat resistant glass barrel having indelibly marked calibrations with subdivisions to 1 mm³ and stainless steel plunger. **Without needle,** accepts any Luer fitting needle ... ... Each **£4·70** *m*



SY-500

***SY-520**

SYRINGE, 500 µl, glass and ptfe, for gases. With heat resistant glass barrel having indelibly marked calibrations with subdivisions to 10 mm³ and ptfe piston. **Without needle,** accepts any Luer fitting needle. Each **£8·75** *f*



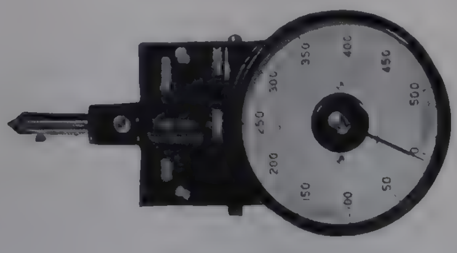
SY-520

***SY-550**

SYRINGE NEEDLE, stainless steel with nickel plated brass Luer connection. Intended originally for gas chromatography the needle is sheathed with a 40 × 0·71 mm sheath from which it projects 10 × 0·36 mm. The tip is 0·15 mm bore and has a 17° axial point to minimise damage to septa ... ... Each **£0·70** *f*

SY-550

All items on this page normally available from stock.



TB-020

Hand type tachometer for use with centrifuges see CF-480 in List No. sequence.

Tally counters see COUNTERS in List No. sequence.

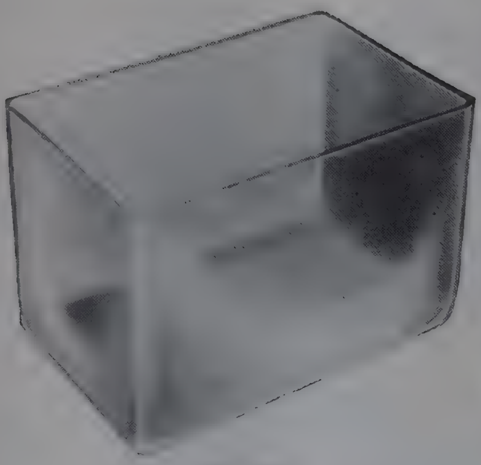
Stroboscopes see SV-800 in List No. sequence.

TB-020

TACHOMETER, for measuring speed of rotation in either direction. The scale is graduated 0–500 rev/min, and a ×10, ×100 range switch enables readings to be made up to 50,000 rev/min, complete with pointer lock enabling readings to be taken after withdrawal, male and female hard rubber centres, 7·5 cm extension piece, and disk attachment for surface speed measurement. In protective case ... ... Each **£21·00** *m*

TANKS

(Dimensions and capacities given below are approximate)



TB-550

TB-600

TB-650

TANKS, aquaria	see	BIOLOGY		
glass	see	Pneumatic troughs under GAS COLLECTING		
polythene	see	Waste bins under WASTE DISPOSAL		
perspex	see	JARS		
TAPES, adhesive	see	PLASTICS SUNDRIES		
heating	see	HEATING TAPES		
labelling	see	LABELS		
measuring	see	RULES		

***TB-550**

TANKS, glass, rectangular.

Capacity	1·75	3	5·5 litres	
Height	12·5	15	17·5 cm	
Length	17·5	20	25 cm	
Width	12·5	15	17·5 cm	
Ten	**£14·00**	**17·50**	**22·00**	c
Each	**£ 1·55**	**1·95**	**2·45**	
Capacity (approx.)	9	14	25 litres	
Height	20	22·5	27·5 cm	
Length	30	35	40 cm	
Width	20	22·5	27·5 cm	
Ten	**£36·00**	**45·00**	—	c
Each	**£4·10**	**5·00**	**8·40**	

TB-560

TANKS, glass, rectangular.

Capacity	35	48 litres	
Height	30	30 cm	
Length	45	60 cm	
Width	30	30 cm	
Each	**£12·40**	**15·50**	c

TB-600

TANKS, *Pyrex brand* glass, circular, with ground edge. For storage of specimens and also suitable for use as thermostat baths.

Capacity (approx.)	2	8	12	30 litres	
Diameter	15	20	25	30 cm	
Height	15	30	30	45 cm	
Wall	2–4	2–4	3–6	3–6 mm	
Each	**£1·30**	**2·35**	**5·45**	**8·05**	*m*

Gallenkamp **THERMO STIRRERS for converting suitable tanks into temperature controlled water baths**—see TM-840 and TM-860 in List No. sequence.

TB-650

TANKS, rigid polythene, rectangular, for storage of chemicals within the limits of the chemical resistance of polythene.

Capacity	54	90	145 litres	
Height	29	45	48 cm	
Length	58	45	64 cm	
Width	44	45	47 cm	
Each	**£5·70**	**8·25**	**9·75**	*m*

All items on this page normally available from stock.

TEMPERATURE MEASUREMENT

For general guidance we list briefly below details of apparatus available for temperature measurement and calibration purposes. Full information will be found under the List Nos. indicated.

FURNACES	List No. FS-400
OIL BATH, calibrating	List No. OD-050
PENCILS, Thermochrom, temperature indicating	List No. PC-980 et seq.
POTENTIOMETERS	List No. EF-628
PYROMETER INDICATORS AND CONTROLLERS	List No. PX-020 et seq.
THERMOCOUPLE TEST SET	List No. PX-375
THERMOMETERS	List No. TJ-050 et seq.
THERMOSTAT BATHS, heated	List No. VS-615, VS-670
THERMOSTAT BATHS, cooled	List No. WF-720 et seq.

TEST PAPERS

TEST PAPERS, indicator, pack of 10 books each of 20 leaves measuring 65×10 mm.

List No.	Indicator	pH range	Colour change	10 packs	Pack	
				£	£	
TE-014	Litmus, red	5·0–8·0	Red-blue	1·35	0·20	*m*
TE-015	Litmus, blue	5·0–8·0	Blue-red	1·35	0·20	*m*

TE-041
TEST PAPERS, pH wide range, 1·0 to 11·0 pack of 10 books each of 20 leaves measuring 65×10 mm. With colour chart on book cover showing colour changes in steps of 1·0 pH ... 10 packs **£2·00** Pack **£0·26** *m*

TEST PAPERS, miscellaneous, pack of 10 books each of 20 leaves measuring 67×12·5 mm.

List No.	Indicator	Application	Colour change	10 packs	Pack	
				£	£	
TE-050	Cobalt chloride	Moisture	Pink-blue	1·40	0·21	*m*
TE-051	Lead acetate	Hydrogen sulphide	White-black	1·40	0·21	*m*
TE-053	Starch-pot. iodide	Oxidising agents	White-blue	1·40	0·21	*m*

TEST PAPERS, *Whatman–BDH,* plastics reel dispensers with colour reference chart on side, containing 5 metres×10 mm paper. Convenient and economical in use.

List No.	Code No.	Test	Ten	Each	
			£	£	*d*
TE-070	FR 1–14	Full range pH 1–14	2·25	0·29	
		Narrow range			
TE-074	NR 1–4	pH 1–4	2·10	0·27	*d*
TE-075	NR 4–6	pH 4–6	2·10	0·27	*d*
TE-076	NR 6–8	pH 6–8	2·10	0·27	*d*
TE-077	NR 8–10	pH 8–10	2·10	0·27	*d*
TE-078	NR 10–12	pH 10–12	2·10	0·27	*d*
TE-079	NR 12–14	pH 12–14	2·10	0·27	*d*
TE-085	LR	Litmus, red	2·10	0·27	*d*
TE-086	LB	Litmus, blue	2·10	0·27	*d*
TE-090	PP	Phenolphthalein	2·10	0·27	*d*
TE-092	CR	Congo red	2·10	0·27	*d*
TE-100	LA	Lead acetate	2·25	0·29	*d*
TE-105	SI	Starch–iodide	2·25	0·29	*d*

OTHER APPARATUS FOR pH MEASUREMENT

Lovibond nessleriser	see	**CT-840** et seq.
Lovibond comparator	see	**CT-700** et seq.
pH meters	see	**EJ-312** et seq.
BDH soil testing outfit	see	**SH-140**

All items on this page normally available from stock.

TEST TUBES

SODA-LIME GLASS

TF-100

TEST TUBES, soda-lime glass, normal wall, with rims. (BS 3218 light wall thickness).

Dimensions mm	Pack qty.	10 packs	Pack	
		£	**£**	
50 × 6	144	**5·60**	**0·62**	c
75 × 10	144	**5·70**	**0·64**	c
75 × 12	144	**5·70**	**0·64**	c
100 × 12	72	**3·30**	**0·39**	c
100 × 16	72	**4·20**	**0·47**	c
125 × 12	72	**4·30**	**0·48**	c
125 × 16	72	**5·00**	**0·56**	c
150 × 16	72	**5·90**	**0·66**	c
150 × 19	72	**7·60**	**0·84**	c
150 × 25	72	**10·80**	**1·20**	c
175 × 30	72	**27·50**	**3·10**	c

TF-104

TEST TUBES, soda-lime glass, heavy wall, rimless, bacteriological grade. The 75 × 12 mm tube is suitable for the Kahn test.

Dimensions mm	Pack qty.	10 packs	Pack	
		£	**£**	
75 × 10	144	**7·00**	**0·78**	c
75 × 12	144	**7·00**	**0·78**	c
100 × 12	72	**4·70**	**0·52**	c
100 × 16	72	**5·10**	**0·57**	c
125 × 12	72	**5·30**	**0·59**	c
125 × 16	72	**6·60**	**0·74**	c
150 × 16	72	**7·40**	**0·82**	c
150 × 19	72	**9·20**	**1·02**	c
150 × 25	72	**15·00**	**1·70**	c
175 × 30	72	**29·50**	**3·30**	c

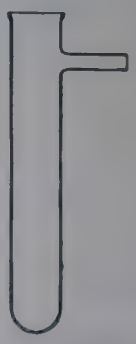
TF-110

TEST TUBES, soda-lime glass, with side arm.

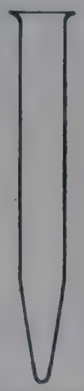
Length	125	150 mm	
Diameter	15	20 mm	
Ten	**£1·00**	**1·45**	*a*
Each	**£0·17**	**0·21**	

TF-100
TF-180
TF-184

TF-104
TF-122
TF-128
TF-182
TF-186



TF-110



TF-123

NEUTRAL RESISTANCE GLASS

TF-122

TEST TUBES, Durham fermentation, to BS 625, neutral resistance glass, rimless.

Length	30	35	50 mm	
Diameter	6	8	7·5 mm	
Pack qty.	288	288	144	
Pack	**£2·00**	**2·05**	**1·00**	c

TF-123

TEST TUBE, Dreyer, to BS 625, neutral resistance glass, with rim. Dimensions 60 × 7 mm in pack of 144.

Pack **£3·40** c

TF-128

TEST TUBES, neutral resistance glass, medium wall, rimless, bacteriological grade, nominal wall thickness 0·75 mm. Coefficient of expansion $5 \cdot 1 \times 10^{-6}$.

Dimensions mm	Pack qty.	10 packs	Pack	
		£	**£**	
75 × 10	144	**10·40**	**1·16**	c
100 × 12	72	**7·40**	**0·82**	c
100 × 16	72	**8·60**	**0·96**	c
125 × 16	72	**9·60**	**1·06**	c
150 × 16	72	**11·80**	**1·35**	c
150 × 19	72	**16·00**	**1·80**	c
150 × 25	72	**20·50**	**2·30**	c

Test tubes for special purposes are shown elsewhere in the catalogue as indicated below. Full details are given in List No. sequence.

	List No.
Colorimetry	
Test tube, uniform diameters	CS-270
Culture Apparatus	
Test tube, tissue culture	CX-465
Test tube, Leighton	CX-470, CX-472
Dairy Products	
Test tube, methylene blue test	DB-220
Test tube, solubility index	DE-600
Petroleum and Allied Products	
Test tube, drop point IP 31	PE-822
Test tube, drop point ASTM D 566–IP 132	PE-830

All items on this page normally available from stock.

TEST TUBES

BOROSILICATE GLASS

TF-180

TEST TUBES, *Pyrex brand* **glass,** light wall, with rims.

TF-182

TEST TUBES, *Pyrex brand* **glass,** light wall, rimless.

TF-184

TEST TUBES, *Pyrex brand* **glass,** medium wall, with rims.

TF-186

TEST TUBES, *Pyrex brand* **glass,** medium wall, rimless.

For illustrations TF-180 to TF-186 see opposite page.

List Nos.		TF-180 and TF-182		TF-184 and TF-186		
Dimensions mm	Std. pack qty.	Std. pack	12 tubes	Std. pack	12 tubes	
		£	£	£	£	
75×10	144	2·00	0·23	2·95	0·31	*d*
75×12	144	2·15	0·25	3·35	0·34	*d*
100×12	144	2·60	0·28	3·40	0·35	*d*
100×16	144	4·05	0·40	—	—	*d*
125×16	144	3·50	0·36	5·80	0·54	*d*
150×12	144	3·05	0·32	—	—	*d*
150×16	144	3·95	0·39	6·05	0·57	*d*
150×19	144	4·35	0·42	7·00	0·66	*d*
150×24	144	5·90	0·55	9·45	0·88	*d*
180×18	144	4·45	0·43	—	—	*d*
200×24	72	4·05	0·74	—	—	*d*
200×32	72	8·55	1·55	11·85	2·15	*d*
200×38	36	5·75	2·00	6·55	2·30	*d*

TF-280

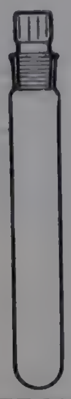
TEST TUBES, borosilicate glass, with ground neck to take glass stoppers SU-520 or plastics stoppers SU-700.

Length	100	125	150 mm	
Diameter	12	16	22 mm	
Neck size	10/13	14/15	19/17	
Ten	£1·25	1·45	1·75	*a*
Each	£0·19	0·21	0·24	

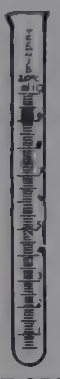
ACCESSORIES

SU-520 Stoppers, hollow blown glass.
SU-700 Stoppers, polypropylene.
} For details and prices see entries in List No. sequence.

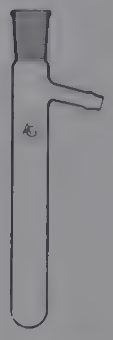
STOPPERED TEST TUBES see also **QUICKFIT APPARATUS**



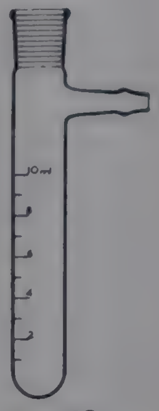
TF-280 with SU-520



TF-350



TF-410



TF-422

TF-350

TEST TUBE, Ⓐ, **borosilicate glass,** graduated. Capacity 10 cm³ subdivided 0·1 cm³.
Ten **£3·60** Each **£0·42** *a*

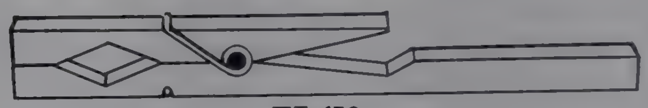
TF-410

TEST TUBE, Ⓐ, **borosilicate glass,** with 19/26 socket and sidearm suitable for use with Hirsch funnel FM-923. Length 150 mm, diameter 20 mm.
Ten **£5·30** Each **£0·59** *a*

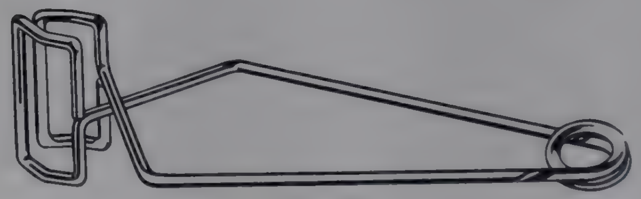
TF-422

TEST TUBE, Ⓐ, **borosilicate glass,** graduated 0 to 10 cm³ in 1·0 cm³, with 14/15 socket and sidearm, as used in Ⓐ small scale preparative sets DT-760 and DT-765.
Ten **£6·40** Each **£0·72** *a*

ACCESSORIES



TF-450



TF-455

TF-450

TEST TUBE HOLDER, hardwood, with wire spring. Overall length 20 cm. Accepts tubes up to 25 mm dia.
In pack of 10 ... 10 packs **£5·00** Pack **£0·56** c

TF-455

TEST TUBE HOLDER, spring steel, nickel plated. Overall length 15 cm. Accepts tubes up to 32 mm dia.
In pack of 10 ... 10 packs **£8·20** Pack **£0·92** c

BU-550 to BU-562
TEST TUBE BRUSHES
SM-822 to SM-885
TEST TUBE STANDS
TS-250
TEST TUBE TONGS
} For details see entries in List No. sequence.

All items on this page normally available from stock.

THERMOMETERS

Foreword

A selection of thermometers is listed in this section covering most requirements for academic and industrial laboratories. The section contains British Standard thermometers with and without test certificates, general purpose thermometers and a selection of dial and industrial thermometers. Special thermometers are included such as used in calorimetry, melting point determinations and petroleum testing to IP specifications.

GENERAL INFORMATION

Mercury-in-glass thermometers are still the most convenient devices for measuring temperature quickly and with reasonable accuracy. Alcohol, pentane and toluene are used to fill low temperature thermometers but such thermometers do not have the same accuracy as mercury thermometers.

ENGRAVED STEM THERMOMETERS

These comprise selected glass tubes, of very fine and uniform bores, sealed to bulbs, the scales being engraved directly onto the stems.

ENCLOSED OPAL GLASS SCALE THERMOMETERS

These thermometers comprise capillary tubes of small outside diameters, sealed to bulbs and the stems so produced anchored to scales made of opal glass. The capillaries and scales are both enclosed in outer protective glass tubes.

IMMERSION DEPTH

Most standard thermometers are calibrated to give a correct reading of temperature when the liquid in the thermometer is completely immersed in the medium being tested. In theory that part of the stem above the fluid level in the thermometer should not be immersed, but in practice it is necessary to have the thermometer fluid level slightly above the sample level in order to read the thermometer. Partial immersion thermometers are calibrated to read correctly when immersed up to a definite point indicated on the stem. In theory, the temperature of vapour surrounding the emergent portion should be the same as during standardisation and calibration, but this condition is difficult to obtain. Thus, total immersion thermometers are considered more accurate although if insufficiently immersed these thermometers will read low for temperatures above the surroundings and vice-versa. **All standard thermometers are calibrated for total immersion unless otherwise stated.**

TEST CERTIFICATES

The testing of liquid-in-glass thermometers is shared by the British Standards Institution and the National Physical Laboratory and the BST and NPL certificates issued respectively by these authorities are of equal standing. Both authorities accept thermometers which are manufactured to conform with the appropriate British Standard or other recognised specifications for testing and retesting. Such thermometers are provided with certificates which give corrections at 5 or more points according to the type and accuracy of the thermometer. A test certificate is a verification of the accuracy of a thermometer and not a guarantee of correct functioning. Thermometers should be re-tested at intervals not exceeding five years, or more frequently if determination of the zero or other suitable fixed point indicates that a re-test is required.

Users may submit thermometers direct to the BSI or NPL. Further details of the procedure are given in Test Leaflet TL12 issued by the British Standards Institution, Maylands Avenue, Hemel Hempstead, Hertfordshire, England.

CARE OF LIQUID-IN-GLASS THERMOMETERS

Liquid-in-glass thermometers are liable to be put out of order during transit or when otherwise subjected to undue vibration. The following is a summary of the defects which are likely to occur and the best remedial procedures which can be carried out by the user.

Gas trapped in bulb. First tap any bubbles of gas into the top of the bulb then cool the bulb by immersion in a suitably cold medium, until the mercury contracts sufficiently for the trapped gas to be forced above the mercury. It may be necessary to heat and cool the thermometer two or three times to do this. Should a thermometer need cooling to very low temperatures for this purpose (see RJ-500 Freezer Aerosol in List No. sequence), it should not be shaken or vibrated while the mercury is frozen solid.

Gas trapped in contraction chamber. The mercury can be cooled as described above until the gas is above the mercury.

Divided column. The parts may be rejoined by cooling as described above.

Detached mercury at the top of contraction chamber. It is necessary to cool the bulb until mercury comes down into the contraction chamber. The side of the stem should be gently tapped until the detached mercury forms a globule on the wall of the contraction chamber. By gently heating the bulb this mercury can be rejoined to the main column.

Detached mercury in expansion chamber. Tap the top of the stem until the detached mercury collects on the top of the capillary. Heat the thermometer bulb, taking great care if the thermometer is a high temperature one. As the expanding mercury forces gas into the expansion chamber continue to tap the stem in order to keep the detached mercury on top of the capillary.

Mercury in U-tube of Beckmann thermometer. For safety in transit, the U-shaped capillary, at the top of Beckmann thermometers, is frequently almost filled with mercury. To rejoin this mercury to the main column so that zero can be set at the required point, the top of stem just below the metal cap is gently warmed until the mercury in the U-capillary expands thereby driving some into the bore. All the mercury should then siphon into the bulb and fill the bore. The trapped gas can then be cleared by the cooling method already described.

STORAGE OF THERMOMETERS

Those thermometers having ranges entirely below ambient temperature should if possible, be stored vertically with the bulbs downwards. Spirit thermometers should always be stored away from direct sunlight. Thermometers after usage should be allowed to reach air temperature before storage.

Apparatus for calibration of thermometers and pyrometers see list under TEMPERATURE MEASUREMENT.

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THERMOMETERS LISTED IN OTHER SECTIONS

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Oven	see HJ-108 MV-616, OV-178
Soil	see SH-210
Standard joint	see *Quickfit* apparatus

Details and prices will be found in List No. sequence.

BRITISH STANDARDS FOR THERMOMETERS

BS 593	Laboratory thermometers
BS 619	Incubator, water bath and oven thermometers for laboratory use
BS 691	Clinical maximum thermometers
BS 791	Bomb calorimeter thermometers
BS 1365	Short-range short-stem thermometers
BS 1704	General purpose thermometers
BS 2840	General purpose maximum and minimum thermometers (Six's pattern)

TEMPERATURE CONVERSION TABLE

(Sauveur's Arrangement)

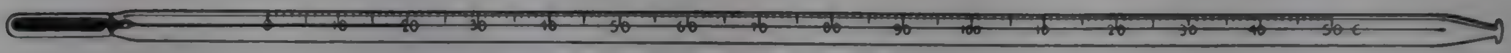
The middle column is the known temperature in °C or °F. The equivalent temperature on the other scale is to right or left of this figure depending on the conversion desired. For example: 100°C is 212°F and 100°F is 37·8°C.

—70 to —1			0 to 34			35 to 69			70 to 89			90 to 1000			1100 to 3000		
C		F	C		F	C		F	C		F	C		F	C		F
—112	**—170**	—274	—17·8	**0**	32	1·7	**35**	95·0	21·1	**70**	158	32·2	**90**	194	593	**1100**	2012
—107	**—160**	—256	—17·2	**1**	33·8	2·2	**36**	96·8	21·7	**71**	159·8	32·8	**91**	195·8	649	**1200**	2192
—101·2	**—150**	—238	—16·7	**2**	35·6	2·8	**37**	98·6	22·2	**72**	161·6	33·3	**92**	197·6	704	**1300**	2372
—96	**—140**	—220	—16·1	**3**	37·4	3·3	**38**	100·4	22·8	**73**	163·4	33·9	**93**	199·4	760	**1400**	2552
—90	**—130**	—202	—15·6	**4**	39·2	3·9	**39**	102·2	23·3	**74**	165·2	34·4	**94**	201·2	816	**1500**	2732
—84	**—120**	—184	—15·0	**5**	41·0	4·4	**40**	104·0	23·9	**75**	167·0	35·0	**95**	203·0	871	**1600**	2912
—79	**—110**	—166	—14·4	**6**	42·8	5·0	**41**	105·8	24·4	**76**	168·8	35·6	**96**	204·8	927	**1700**	3092
—73·4	**—100**	—148	—13·9	**7**	44·6	5·6	**42**	107·6	25·0	**77**	170·6	36·1	**97**	206·6	982	**1800**	3272
—68	**—90**	—130	—13·3	**8**	46·4	6·1	**43**	109·4	25·6	**78**	172·4	36·7	**98**	208·4	1038	**1900**	3452
—62	**—80**	—112	—12·8	**9**	48·2	6·7	**44**	111·2	26·1	**79**	174·2	37·2	**99**	210·2	1093	**2000**	3632
—57	**—70**	—94	—12·2	**10**	50·0	7·2	**45**	113·0	26·7	**80**	176·0	37·8	**100**	212	1149	**2100**	3812
—51	**—60**	—76	—11·7	**11**	51·8	7·8	**46**	114·8	27·2	**81**	177·8	93·3	**200**	392	1204	**2200**	3992
—45·6	**—50**	—58	—11·1	**12**	53·6	8·3	**47**	116·6	27·8	**82**	179·6	149	**300**	572	1260	**2300**	4172
—40·0	**—40**	—40	—10·6	**13**	55·4	8·9	**48**	118·4	28·3	**83**	181·4	204	**400**	752	1316	**2400**	4352
—34·4	**—30**	—22	—10·0	**14**	57·2	9·4	**49**	120·2	28·9	**84**	183·2	260	**500**	932	1371	**2500**	4532
—28·9	**—20**	—4	—9·4	**15**	59·0	10·0	**50**	122·0	29·4	**85**	185	316	**600**	1112	1427	**2600**	4712
—28·3	**—19**	—2·2	—8·9	**16**	60·8	10·6	**51**	123·8	30·0	**86**	186·8	371	**700**	1292	1482	**2700**	4892
—27·8	**—18**	—0·4	—8·3	**17**	62·6	11·1	**52**	125·6	30·6	**87**	188·6	427	**800**	1472	1538	**2800**	5072
—27·2	**—17**	1·4	—7·8	**18**	64·4	11·7	**53**	127·4	31·1	**88**	190·4	482	**900**	1652	1593	**2900**	5252
—26·7	**—16**	3·2	—7·2	**19**	66·2	12·2	**54**	129·2	31·7	**89**	192·2	538	**1000**	1832	1649	**3000**	5432
—26·1	**—15**	5·0	—6·7	**20**	68·0	12·8	**55**	131·0									
—25·6	**—14**	6·8	—6·1	**21**	69·8	13·3	**56**	132·8									
—25·0	**—13**	8·6	—5·6	**22**	71·6	13·9	**57**	134·6									
—24·4	**—12**	10·4	—5·0	**23**	73·4	14·4	**58**	136·4									
—23·9	**—11**	12·2	—4·4	**24**	75·2	15·0	**59**	138·2									
—23·3	**—10**	14·0	—3·9	**25**	77·0	15·6	**60**	140·0									
—22·8	**—9**	15·8	—3·3	**26**	78·8	16·1	**61**	141·8									
—22·2	**—8**	17·6	—2·8	**27**	80·6	16·7	**62**	143·6									
—21·7	**—7**	19·4	—2·2	**28**	82·4	17·2	**63**	145·4									
—21·1	**—6**	21·2	—1·7	**29**	84·2	17·8	**64**	147·2									
—20·6	**—5**	23·0	—1·1	**30**	86·0	18·3	**65**	149·0									
—20·0	**—4**	24·8	—0·6	**31**	87·8	18·9	**66**	150·8									
—19·4	**—3**	26·6	0	**32**	89·6	19·4	**67**	152·6									
—18·9	**—2**	28·4	0·6	**33**	91·4	20·0	**68**	154·4									
—18·3	**—1**	30·2	1·1	**34**	93·2	20·6	**69**	156·2									

INTERPOLATION FACTORS

C		F	C		F	C		F
0·56	**1**	1·8	4·44	**8**	14·4	33·3	**60**	108
1·11	**2**	3·6	5·00	**9**	16·2	38·9	**70**	126
1·67	**3**	5·4	5·56	**10**	18·0	44·4	**80**	144
2·22	**4**	7·2	11·1	**20**	36·0	50·0	**90**	162
2·78	**5**	9·0	16·7	**30**	54·0	55·6	**100**	180
3·33	**6**	10·8	22·2	**40**	72·0			
3·89	**7**	12·6	27·8	**50**	90·0			

GENERAL PURPOSE LABORATORY THERMOMETERS



Typical general purpose thermometer

TJ-050

THERMOMETERS, Centigrade scales, solid stem mercury-in-glass, gas filled. Overall length about 300 mm, stem diameter 5–7 mm. 75 mm immersion.

Scale span °C	Subdiv. degC	Ten	Each	
0 to 60	1·0	£ **6·40**	£ **0·72**	c
−10 to 110	1·0	**5·60**	**0·62**	c
0 to 200	1·0	**6·40**	**0·72**	c
0 to 250	1·0	**7·20**	**0·80**	c
0 to 360	2·0	**7·80**	**0·88**	c
0 to 400	2·0	**8·40**	**0·94**	c

TJ-052

THERMOMETERS, as TJ-050 but **Fahrenheit scales.**

Scale span °F	Subdiv. degF	Ten	Each	
0 to 110	1·0	£ **6·40**	£ **0·72**	c
0 to 240	1·0	**5·80**	**0·64**	c
0 to 400	2·0	**6·40**	**0·72**	c
0 to 600	5·0	**7·80**	**0·88**	c

TJ-058

THERMOMETER, short stem. Similar to TJ-050 but 150 mm long, scale span 0–250°C in 2degC. Specially suitable for semi-micro use with (AG) small scale preparative set DT-765 ... ... Ten **£15·50** Each **£1·70** c

TJ-060

THERMOMETERS, Centigrade scales, solid stem mercury-in-glass, gas filled, with safety chamber. Overall length about 400 mm, diameter 5–7 mm. The graduations commence about 10 cm above the mercury bulb.

Scale span °C	Subdiv. degC	Ten	Each	
0 to 105	0·5	£ **11·40**	£ **1·30**	c
0 to 150	1·0	**11·40**	**1·30**	c
0 to 250	1·0	**11·80**	**1·35**	c
0 to 360	2·0	**12·00**	**1·35**	c

THERMOMETERS WHICH INDICATE WRONG TEMPERATURES

Wrong indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedure detailed on page 728.

TJ-070

THERMOMETERS, Standard A, Centigrade scales
A series of high quality accurate thermometers, finely divided on solid stem, gas filled, with safety chamber, calibrated at total immersion.

No.	Scale span °C	Subdiv. degC	Length mm	Ten	Each	
1	−5 to 50	0·2	350	£ **11·80**	£ **1·35**	c
2	−5 to 50	0·1	400	**13·20**	**1·50**	c
3	−5 to 105	0·2	350	**14·60**	**1·65**	c
4	−5 to 105	0·1	450	**21·00**	**2·35**	c

ADJUSTABLE IMMERSION THERMOMETERS. Suitable for standard joint assemblies and many other purposes see TJ-320 in List No. sequence.

All items on this page normally available from stock.

GENERAL PURPOSE LABORATORY THERMOMETERS TO BS 1704

Solid stem, gas filled, mercury-in-glass thermometers with safety chambers, in four series: Centigrade scales for total and partial immersion and Fahrenheit scales for total and partial immersion. The first of each total immersion series is spirit filled.

TJ-100

THERMOMETERS, to BS 1704, Centigrade scales, for total immersion. Stem diameter 6 mm.

Schedule mark	Scale span °C	Sub-div. degC	Length mm	Ten	Each	
				£	£	
B.GP.35C/TOT	−120 to +35	1·0	350	17·50	1·95	c
GP.50C/TOT	−35 to +50	0·5	300	13·40	1·50	c
GP.105C/1·0/TOT	−5 to +105	1·0	300	8·20	0·92	c
GP.105C/0·5/TOT	−5 to +105	0·5	300	9·60	1·08	c
GP.150C/TOT	−5 to +150	1·0	300	10·00	1·12	c
GP.250C/TOT	−5 to +250	1·0	300	10·40	1·16	c
GP.360C/TOT	−5 to +360	1·0	350	13·40	1·50	c
GP.400C/TOT	−10 to +400	2·0	300	13·60	1·55	c
GP.510C/TOT	−10 to +510	2·0	380	26·50	3·00	c

TJ-104

THERMOMETERS, to BS 1704 Fahrenheit scales, for total immersion. Stem diameter 6 mm.

Schedule mark	Scale span °F	Sub-div. degF	Length mm	Ten	Each	
				£	£	
B.GP.96F/TOT	−180 to + 96	2·0	350	15·50	1·75	c
GP.120F/TOT	−35 to +120	1·0	300	13·40	1·50	c
GP.220F/TOT	30 to 220	1·0	300	8·20	0·92	c
GP.300F/TOT	30 to 300	1·0	300	10·00	1·12	c
GP.500F/TOT	28 to 500	2·0	300	10·40	1·16	c
GP.650F/TOT	26 to 650	2·0	350	13·20	1·50	c
GP.750F/TOT	20 to 750	5·0	300	13·40	1·50	c
GP.950F/TOT	20 to 950	5·0	380	25·00	2·80	c

TJ-102

THERMOMETERS, to BS 1704, Centigrade scales, for partial (100 mm) immersion. Stem diameter 6 mm.

Schedule mark	Scale span °C	Sub-div. degC	Length mm	Ten	Each	
				£	£	
GP.50C/100	−35 to + 50	0·5	350	12·80	1·45	c
GP.105C/1·0/100	−5 to +105	1·0	300	15·50	1·75	c
GP.105C/0·5/100	−5 to +105	0·5	300	8·20	0·92	c
GP.150C/100	−5 to +150	1·0	300	10·00	1·12	c
GP.250C/100	−5 to +250	1·0	300	10·40	1·16	c
GP.360C/100	−5 to +360	1·0	350	11·80	1·35	c
GP.400C/100	−10 to +400	2·0	300	16·00	1·80	c
GP.510C/100	−10 to +510	2·0	380	23·00	2·60	c

TJ-106

THERMOMETERS, to BS 1704, Fahrenheit scales, for partial (100 mm) immersion. Stem diameter 6 mm.

Schedule mark	Scale span °F	Sub-div. degF	Length mm	Ten	Each	
				£	£	
GP.120F/100	−35 to +120	1·0	300	13·40	1·50	c
GP.220F/100	30 to 220	1·0	300	8·20	0·92	c
GP.300F/100	30 to 300	1·0	300	10·00	1·12	c
GP.500F/100	28 to 500	2·0	300	10·40	1·16	c
GP.650F/100	26 to 650	2·0	350	13·20	1·50	c
GP.750F/100	20 to 750	2·0	300	13·40	1·50	c
GP.950F/100	20 to 950	5·0	380	25·00	2·80	c

All items on this page normally available from stock.

STANDARD LABORATORY THERMOMETERS TO BS 593

TJ-150

THERMOMETERS, to BS 593, Series A, Centigrade scales, for total immersion. With zero check scale −0·5 to +0·5°C where applicable. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
A.20C/TOT	−20·5 to +20·5	0·1	£ 18·50	£ 2·10	c
A.40C/TOT	− 0·5 to +40·5	0·1	19·00	2·15	c
A.70C/TOT	39·5 to 70·5	0·1	31·00	3·50	c
A.100C/TOT	69·5 to 100·5	0·1	34·00	3·80	c
A.130C/TOT	99·5 to 130·5	0·1	36·00	4·00	c
A.160C/TOT	129·5 to 160·5	0·1	39·00	4·40	c

TJ-154

THERMOMETERS, to BS 593, Series A, Centigrade scales, for partial (100 mm) immersion. With zero check scale −0·5 to +0·5°C where applicable. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
			£	£	
A.10C/100	−30·5 to +10·5	0·1	18·50	2·10	c
A.20C/100	−20·5 to +20·5	0·1	18·50	2·10	c
A.40C/100	− 0·5 to +40·5	0·1	18·50	2·10	c
A.70C/100	39·5 to 70·5	0·1	31·00	3·50	c
A.100C/100	69·5 to 100·5	0·1	34·00	3·80	c
A.130C/100	99·5 to 130·5	0·1	36·00	4·00	c
A.160C/100	129·5 to 160·5	0·1	39·00	4·40	c

TJ-170

THERMOMETERS, to BS 593, Series B, Centigrade scales, for total immersion. With zero check scale −1 to +1°C. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
B.60C/TOT	−20 to +60	0·2	£ 15·50	£ 1·75	c
B.110C/TOT	50 to 110	0·2	31·00	3·50	c
B.160C/TOT	99 to 160	0·2	33·00	3·70	c
B.210C/TOT	150 to 210	0·2	34·00	3·80	c
B.260C/TOT	200 to 260	0·2	36·00	4·00	c

TJ-174

THERMOMETERS, to BS 593, Series B, Centigrade scales, for partial (100 mm) immersion. With zero check scale −1 to +1°C. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
B.60C/100	−20 to +60	0·2	£ 15·50	£ 1·75	c
B.110C/100	50 to 110	0·2	31·00	3·50	c
B.160C/100	99 to 160	0·2	33·00	3·70	c
B.210C/100	150 to 210	0·2	34·00	3·80	c
B.260C/100	200 to 260	0·2	36·00	4·00	c

TJ-200

THERMOMETERS, to BS 593, Series C, Centigrade scales, for total immersion. Overall length about 200 mm, stem diameter 5·0 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
C.105C/TOT	−5 to +105	1·0	£ 17·00	£ 1·90	c
C.205C/TOT	95 to 205	1·0	19·00	2·15	c
C.305C/TOT	195 to 305	1·0	20·00	2·25	c
C.400C/TOT	295 to 400	1·0	22·50	2·50	c

TJ-208

THERMOMETERS to BS 593, Series C, Centigrade, scales, for partial (100 mm) immersion. Overall length about 250 mm, stem diameter 5·0 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
C.105C/100	−5 to +105	1·0	£ 17·00	£ 1·90	c
C.205C/100	95 to 205	1·0	19·00	2·15	c
C.305C/100	195 to 305	1·0	20·00	2·25	c
C.400C/100	295 to 400	1·0	22·50	2·50	c

TJ-230

THERMOMETERS, to BS 593, Series F, Centigrade scales, for partial (100 mm) immersion. Overall length about 385 mm, stem diameter 6·0 to 7·5 mm.

Schedule mark	ASTM No.	Scale span °C	Subdiv. degC	Ten	Each	
F.50C/100	37C	−2 to +52	0·2	£ 19·00	£ 2·15	c
F.75C/100	38C	24 to 78	0·2	24·00	2·70	c
F.100C/100	39C	48 to 102	0·2	24·00	2·70	c
F.125C/100	40C	72 to 126	0·2	25·50	2·85	c
F.150C/100	41C	98 to 152	0·2	28·00	3·20	c
F.255C/100	42C	95 to 255	0·5	33·00	3·70	c

All items on this page normally available from stock.

STANDARD LABORATORY THERMOMETERS to BS 1365

Short range, short stem thermometers intended to meet the requirements for thermometers of the Anschutz and similar types. In series covering the ranges of —10 to +360°C with scale span of about 60degC. Overall length about 220 to 240 mm.

TJ-264

THERMOMETERS, to BS 1365, Series A2, Centigrade scales, for partial (80 mm) immersion. Stem diameter 5 to 6 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
			£	£	
SA. 55C/80	−10 to +55	0·2	**15·50**	**1·75**	c
SA.105C/80	45 to 105	0·2	**16·50**	**1·85**	c
SA.155C/80	95 to 155	0·2	**17·00**	**1·90**	c
SA.205C/80	145 to 205	0·2	**18·50**	**2·10**	c
SA.255C/80	195 to 255	0·2	**19·50**	**2·20**	c
SA.305C/80	245 to 305	0·2	**22·00**	**2·45**	c
SA.360C/80	295 to 360	0·2	**24·00**	**2·70**	c

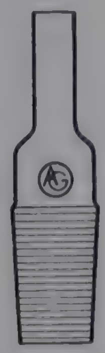
ADJUSTABLE IMMERSION THERMOMETERS

TJ-320

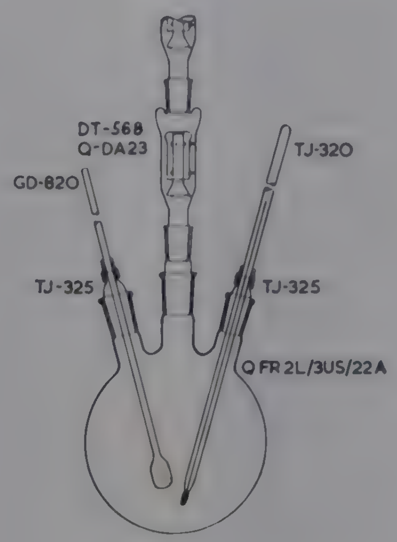
THERMOMETERS, solid stem, adjustable immersion depth, Centigrade scales, for use in thermometer adapter TJ-325. These thermometers are calibrated for an average immersion of 120 mm and may be used at between 75 and 180 mm immersion depth. Small tolerance on diameter gives a clearance of less than 0·5 mm in the sleeve. Overall length 400 mm, with lowest graduation 220 mm from bulb, subdivided in 1degC. They are particularly useful for use with standard joint apparatus where the adapter can be placed in a stillhead or flask side neck.

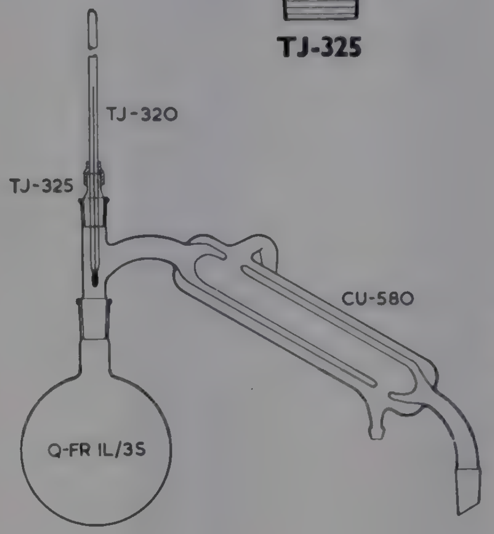
Scale span °C	Subdiv. degC	Ten	Each	
		£	£	
—5 to +105	1	**12·00**	**1·35**	c
95 to 205	1	**15·50**	**1·75**	c
195 to 305	1	**17·50**	**1·95**	c

Hortvet cryoscope thermometers see DC-806, DC-808. **Incubator and oven thermometers** see HJ-108, IH-110, MV-616, MV-618 in List No. sequence.



TJ-325





Assemblies illustrating the versatile use of thermometers TJ-320 with adapters TJ-325.

THERMOMETERS WHICH INDICATE WRONG TEMPERATURES

Wrong indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedure detailed on page 728.

Ⓐ THERMOMETER ADAPTERS

TJ-325

ADAPTERS, Ⓐ thermometer, for fitting thermometers (or gas entry tubes) into standard joint tubulures, allowing adjustment of immersion depth. Consisting of standard joint cone fitted with a short length of selected bore tubing of suitable size to take adjustable immersion thermometer TJ-320 or gas distribution tube GD-800. Will also accept other thermometers or tubes not exceeding 6·5 mm dia. The thermometer is held at the desired depth of immersion by means of a short length of rubber or plastics tubing.

Cone	14/23	19/26	
Ten	**£5·50**	5·80	a
Each	**£0·62**	0·64	

All items on this page normally available from stock.

TJ-340

TJ-400
TJ-404

TJ-440

MELTING POINT THERMOMETERS

TJ-340

THERMOMETERS, for melting point determinations, Centigrade scales, solid stem mercury-in-glass, gas filled with safety chamber adjusted for 30 mm immersion. Thermometer No. 4 is suitable for Rast's method. Overall length about 250 mm except No. 5 which is 300 mm, stem dia. 6 mm.

No.		1	2	3	4	5	
Scale span	from	0	140	290	140	0 °C	
	to	150	300	400	190	360 °C	
Subdiv.		0·5	0·5	0·5	0·5	1degC	
Ten		£15·50	22·00	25·50	19·00	15·50	c
Each		£ 1·75	2·45	2·85	2·15	1·75	

TJ-380

THERMOMETER, water jacket, for use in gas analysers, etc. Scale span 10 to 40°C subdivided in 0·2degC. Overall length 125 mm, stem diameter 5·5 mm.
Ten **£6·80** Each **£0·76** c

TJ-400

THERMOMETERS, stirring, with reinforced bulb, **Centigrade scales.** Yellow enamel back, overall length 150 mm, calibrated at total immersion.

Scale span °C	Subdiv. degC	Ten	Each	
		£	£	
0 to 50	1·0	**6·90**	**0·78**	m
−10 to +110	1·0	**7·60**	**0·84**	m
0 to 150	1·0	**7·10**	**0·78**	m
0 to 250	1·0	**8·10**	**0·90**	m
0 to 360	2·0	**8·40**	**0·94**	m

TJ-404

THERMOMETERS, stirring, with reinforced bulb, as TJ-400 but 300 mm overall length.

Scale span °C	Subdiv. degC	Ten	Each	
		£	£	
0 to 50	1·0	**8·10**	**0·90**	m
−10 to +110	1·0	**7·40**	**0·82**	m
0 to 150	1·0	**7·80**	**0·86**	m
0 to 250	1·0	**8·40**	**0·94**	m
0 to 360	2·0	**9·70**	**1·08**	m

THERMOMETERS WHICH INDICATE WRONG TEMPERATURES

Wrong indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedure detailed on page 728.

THERMOMETERS, red reflector type, solid stem, lens front mercury-in-glass, with red glass strip in stem. The mercury forms a mirror in which is seen a bright red image of the strip. These thermometers can be read more easily and the reading can be seen from a greater distance than with the ordinary mercury pattern and at the same time are free from the disadvantages of spirit filled thermometers.

TJ-440

THERMOMETERS, red reflector type, Centigrade scales, solid stem, lens front. Overall length about 300 mm.

Scale span	0 to 110	0 to 200	0 to 360 °C	
Subdiv.	1·0	1·0	2·0 degC	
Ten	**£12·40**	**13·80**	**16·00**	c
Each	**£ 1·40**	**1·55**	**1·80**	

TJ-442

THERMOMETERS, red reflector type, Fahrenheit scales, solid stems, lens front. Overall length about 300 mm. Scale span 0 to 240°F subdivided 2degF.
Ten **£13·00** Each **£1·45** c

All items on this page normally available from stock.

BECKMANN DIFFERENTIAL THERMOMETERS

Beckmann differential thermometers are used for the accurate measurement of very small changes in temperature, e.g. for boiling point and freezing point determinations. A fine capillary and large bulb enable the scale to be subdivided into 0·01degC, yet the thermometers can be used over a range of about 100degC or more.

Thermometers with zero at top of the scale are for freezing point determinations, i.e. for measuring with falling temperature; those with zero at bottom of scale are for boiling points, i.e. for measuring with rising temperature.

***TJ-521**

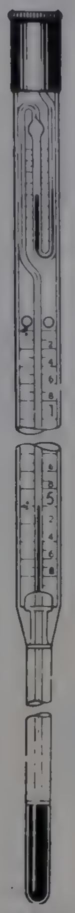
THERMOMETER, Beckmann, approximate range —10 to 150°C, scale span 5 or 6degC, subdivided in 0·01degC, **with zero at top of scale.** Overall length about 550 mm, scale length about 230 mm. Immersion 150 mm ... ... Each **£11·00** c

***TJ-523**

THERMOMETER, Beckmann, as TJ-521, approximate range —10 to 150°C, scale span 5 or 6degC, subdivided in 0·01degC, but **with zero at bottom of scale.**
Each **£11·00** c

***TJ-525**

THERMOMETER, Beckmann, as TJ-521, approximate range —10 to 150°C, but scale span 1degC, subdivided in 0·002degC, and **with zero at bottom of scale.**
Each **£18·00** c



TJ-523

TJ-564 to TJ-577

CALORIMETER THERMOMETERS

6degC RANGE THERMOMETERS TO BS 791

This specification covers a range of seven solid stem thermometers, overall length about 750 mm, with maximum error of 0·1degC at any point and maximum change in error of 0·01degC for any interval of 0·5degC. They are subdivided in 0·01degC.

NPL certificates for these thermometers give the value of corrections at 11 points (each 0·5degC) to an accuracy of ±0·002degC.

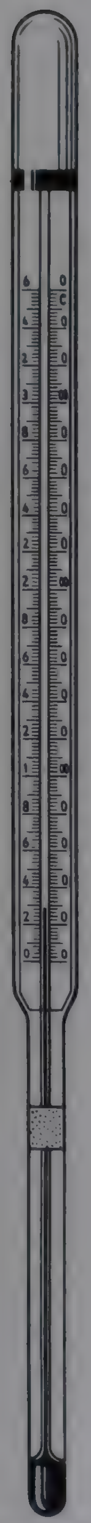
Without certificate

List No.	BS 791 Schedule mark	Scale span °C	Each	
			£	
***TJ-564**	Cal. 15 to 21 C	15 to 21	**16·00**	c
***TJ-566**	Cal. 18 to 24 C	18 to 24	**16·00**	c
***TJ-568**	Cal. 21 to 27 C	21 to 27	**16·00**	c
***TJ-570**	Cal. 24 to 30 C	24 to 30	**16·00**	c
***TJ-572**	Cal. 27 to 33 C	27 to 33	**16·00**	c
***TJ-574**	Cal. 30 to 36 C	30 to 36	**16·00**	c
***TJ-576**	Cal. 33 to 39 C	33 to 39	**16·00**	c

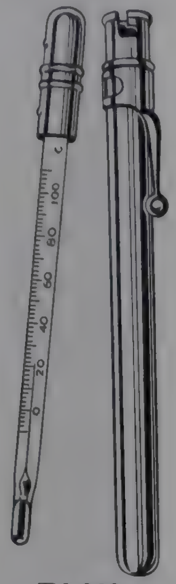
With NPL certificate

List No.	BS 791 Schedule mark	Scale span °C	Each	
			£	
***TJ-565**	Cal. 15 to 21 C	15 to 21	**33·00**	m
***TJ-567**	Cal. 18 to 24 C	18 to 24	**33·00**	m
***TJ-569**	Cal. 21 to 27 C	21 to 27	**33·00**	m
***TJ-571**	Cal. 24 to 30 C	24 to 30	**33·00**	m
***TJ-573**	Cal. 27 to 33 C	27 to 33	**33·00**	m
***TJ-575**	Cal. 30 to 36 C	30 to 36	**33·00**	m
***TJ-577**	Cal. 33 to 39 C	33 to 39	**33·00**	m

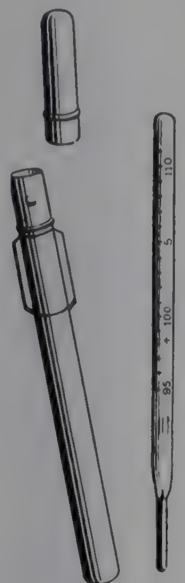
All items on this page normally available from stock.



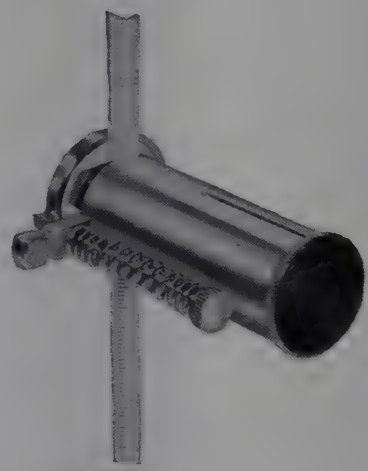
TJ-682



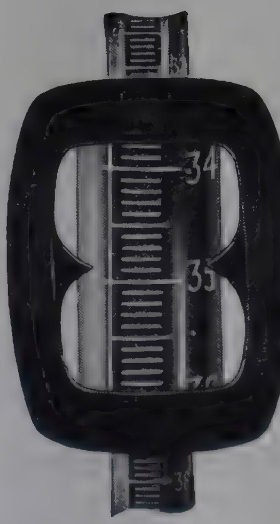
TJ-802



TJ-840



TJ-900



TJ-905

SH-210
SOIL THERMOMETER. For details and prices see entry in List No. sequence.

ENCLOSED OPAL GLASS SCALE THERMOMETERS

THERMOMETERS, enclosed opal glass scale, industrial type, **Centigrade scales,** for total immersion of stem. Length of scale 30 cm, stem diameter 11 mm, scale tube diameter about 19 mm.

List No.	Stem length cm	Scale span °C	Subdiv. degC	Ten	Each	
				£	£	
TJ-680	15	0 to 110	1·0	**26·00**	**2·90**	c
	15	0 to 200	2·0	**28·00**	**3·10**	c
TJ-682	30	0 to 110	1·0	**32·00**	**3·50**	c
	30	0 to 200	2·0	**35·00**	**3·90**	c
	30	0 to 360	2·0	**37·00**	**4·10**	c
TJ-684	60	0 to 200	2·0	**42·00**	**4·70**	c
	60	0 to 360	2·0	**46·00**	**5·10**	c

POCKET THERMOMETERS

TJ-802

THERMOMETER, pocket. A solid stem thermometer approx. 100 mm long fixed at the upper end into a metal cap which fits by means of a bayonet catch into a tubular case fitted with pocket clip. Overall length approx. 140 mm. Range —10° to 110°C in 2degC.
Ten **£7·40** Each **£0·82** c

TJ-803

THERMOMETER, as TJ-802 but scaled 30° to 220°F in 2degF ... ... Ten **£7·00** Each **£0·78** c

CLINICAL THERMOMETERS

THERMOMETERS, CLINICAL, to BS 691, solid stem lens front. The new classification 'long bulb' is approximately equivalent to the earlier half minute model. Scale span 95 to 110°F in 0·2degF in metal case.

List No.	Type	Ten	Each	
		£	£	
TJ-840	'Long bulb' with works certificate	3·70	**0·43**	c
TJ-841	'Long bulb' BST stamped	4·80	**0·54**	c

THERMOMETER READERS

TJ-900

THERMOMETER READER, metal construction, with adjustable focusing eyepiece and spring loaded clip to accommodate thermometers up to 13 mm diameter.
Each **£2·50** c

TJ-905

THERMOMETER READER, with 4 cm long plastics lens held in a rubber moulding and giving an undistorted ×2½ magnification over a wide field. The magnifier clips onto thermometers or burettes up to 13 mm diameter by a stainless steel wire spring. Two pointers formed from the rubber moulding assist the accurate reading of the mercury or liquid meniscus.
Each **£1·30** *f*

All items on this page normally available from stock.

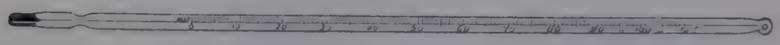
THERMOMETER CASES

TJ-910

THERMOMETER CASES, brass, to take thermometers 5 to 7 mm diameter.

No.	1	2	
For thermometers, overall length	300 to 320	340 to 360 mm	
Ten	£8·20	9·00	c
Each	£0·90	1·02	

TJ-910


TJ-920

MAXIMUM AND MINIMUM AND WALL THERMOMETERS

TJ-920

THERMOMETERS, maximum, solid stem, overall length about 300 mm, stem diameter 6 to 7 mm. After use, the mercury is shaken down in the same manner as a clinical thermometer.

Scale span	–10 to 110	0 to 200	0 to 360°C	
Subdivision	1·0	1·0	2·0degC	
Ten	£20·50	23·00	39·00	c
Each	£ 2·30	2·60	4·40	

TJ-934

THERMOMETER, maximum and minimum, Six's pattern, to BS 2840, for wall mounting. Spirit-in-glass thermometer with mercury indicating thread and two metal cursors mounted on dual scale graduated 0 to +130°F, subdivided in 2degF and −20 to +55°C subdivided in 1degC in hard white plastics frame. Overall length about 270 mm. Complete with magnet.

Ten	£18·50	Each	£2·10	c

TJ-952

THERMOMETER, wall, solid stem, red spirit-in-glass, mounted on 21 × 4 cm hardwood base with ivorine scale graduated 20 to 120°F subdivided in 2degF and −5 to +50°C in 1degC. With bulb guard.

Ten	£5·50	Each	£0·62	c

TJ-954

THERMOMETER, wall, to requirements of Factories Act. Solid stem, lens front, red spirit-in-glass on hardwood scale 250 mm graduated 20 to 120°F subdivided in 2degF with extra bold graduation and figure at 60°F and −10 to 50°C in 1degC. With bulb guard.

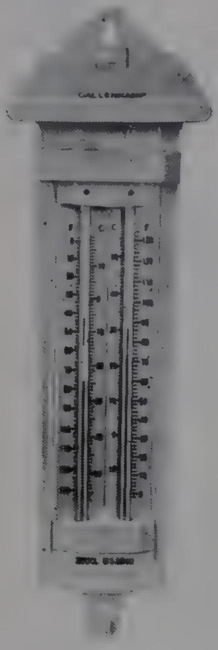
Ten	£5·50	Each	£0·62	c

TJ-960

THERMOMETER, wall, circular dial pattern 15 cm dia. with black plastics frame, dial with black figures on satin aluminium. Scale range −20 to +140°F and −30 to +60°C ... ... Ten **£12·80** Each **£1·45** c

TJ-965

THERMOMETER, bimetallic with 10 cm diameter dial scaled −20 to +140°F and −30 to +60°C, mounted in a metal case. Complete with a slot in the back of the case for wall mounting, and a wire frame for bench mounting ... ... Each **£1·00** c


GALLENKAMP
TJ-934

Gallenkamp
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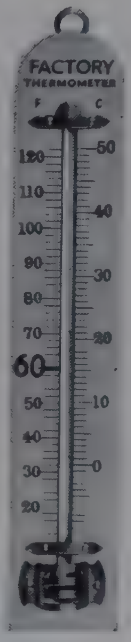
TJ-952


FACTORY
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TJ-965

All items on this page normally available from stock.

PRECISION BIMETALLIC DIAL THERMOMETERS

These Swiss made precision thermometers provide a reliable, rugged alternative to mercury-in-glass thermometers for many laboratory purposes. The stems and dial cases are made of high grade stainless steel. A minimum immersion depth of 6 cm is necessary to attain the potential accuracy of 0·5% of full scale. Stem is 4 mm diameter.

100
150
50
200
0
220
°C

TJ-970 with TJ-972

TJ-980

***TJ-970**

DIAL THERMOMETERS, as specification, with dial 46 mm dia. and stem 200 mm long.

Scale span	—10 to 110	0 to 220	0 to 400°C	
Subdivision	1	2	5degC	
Each	**£5·20**	**5·40**	**5·40**	c

ACCESSORY

***TJ-972** **Holding clip,** for TJ-970, nickel-plated brass, providing handle and mounting clip. Can be used as a clip to hold thermometer in water bath having wall thickness up to 6 mm ... ... Each **£0·85**

Other temperature measuring equipment will be found under the following headings:

PENCILS	PC-980 et seq.
PYROMETERS	PX-020 et seq.

***TJ-980**

DIAL THERMOMETER, as specification, **pocket pattern** with dial 24 mm dia. and stem 120 mm long, complete with pocket clip and protective sheath which must be removed before immersing stem of thermometer in liquid. Scale span 0 to 100°C... ... Each **£3·70** c

***TJ-990**

DIAL THERMOMETER, as specification, **surface pattern** for measuring temperature of flat surfaces such as hotplates. Dial 46 mm dia. Stem 39 mm long with copper end 25 mm dia. Scale span 0 to 400°C.
Each **£5·80** c

200
250
150
300
100
350
50
400
0
°C

TJ-990

THERMOMETER CALIBRATION EQUIPMENT

Oil Baths see OD-050 et seq.

Thermostat Baths, heated see VS-615 et seq.

Thermostat Baths, cooled see WF-720 et seq.

Full details of above will be found in List No. sequence.

All items on this page normally available from stock.

ELECTRICAL THERMOMETERS

DIGITAL READING THERMOMETER

The platinum resistance temperature sensing element acts as part of a self-compensating resistance measuring bridge. The output signal of the bridge is fed via a transistorized amplifier to a stepping motor which maintains the bridge in balance and operates the digita counter.

Technical Data

Measuring range continuous from	—20 to +300°C
Total system accuracy	±0·5degC from —20 to —1°C ±0·15degC from —1 to 100°C ±0·2degC from 100 to 200°C ±0·3degC from 200 to 300°C
Reproducibility	±0·05degC
Reading resolution	0·1degC (1 digital step)
Response time	approx. 100degC/20 seconds
Recorder connection	1 mV/degC; linearity +0·15%
—output voltage	max. 320 mV
—internal resistance	max. 500 Ω
Admissible ambient temperature	—20 to +50°C
Power connection	110 to 250V 50 or 60 Hz single phase supplies
Overall dimensions	115×170×215 mm

Mettler TM 15

TK-010

***TK-010**

THERMOMETER, digital reading, *Mettler* TM15, as specification. With output for recorder but **without temperature probe.** For 110/250V 50/60 Hz single phase supplies ... ... Each **£210·00** *m*

ACCESSORIES

***TK-015**	**Temperature probe,** glass encased, with 2 metres of cable	Each	**£60·00**	*m*
***TK-017**	**Temperature probe,** glass encased, with 4 metres of cable	Each	**£60·00**	*m*
***TK-019**	**Temperature probe,** stainless steel encased, with 2 metres of cable	Each	**£60·00**	*m*
***TK-021**	**Temperature probe,** stainless steel encased, with 4 metres of cable	Each	**£60·00**	*m*
***TK-025**	**Switch,** multiple socket, to accept up to six temperature probes	Each	**£40·00**	*m*

POINTER READING THERMOMETERS

TK-070

THERMOMETER, electrical, battery operated with 9·5 cm scale —50°C to 50°C subdivided every 5degC from —50 to 0°C and every 2degC from 0 to +50°C. With simple operating controls including calibration check and OFF positions. Sockets are provided for connecting **up to six temperature probes,** selection of which is by push buttons on the front panel. In metal case complete with battery. Overall dimensions 21×16×7·5 cm high. Requires but does not include one or more probes ... ... Each **£26·50** *m*

TK-075

THERMOMETER, electrical, as TK-070 but range 10°C to 150°C subdivided every 5degC. In metal case complete with battery. Requires but does not include one or more probes ... ... Each **£30·00** *m*

REPLACEMENT PART

TK-078	**Battery,** Mallory TR134R	Each	**£0·80**	*f*

TK-070
TK-075

ACCESSORIES

TK-080	**Temperature probe,** stainless steel, length 65 mm, diameter 4 mm, mounted in handle 80 mm long and fitted with non-reversible plug and approximately 2 metres of cable	Each	**£8·25**	*m*
TK-084	**Temperature probe,** aluminium, length 15 mm, diameter 6 mm, fitted with removable copper clip for surface temperature measurements, non-reversible plug and approximately 2 metres of cable. Ten **£42·00**	Each	**£4·70**	*m*
TK-088	**Carrying case**	Each	**£3·20**	*m*

All items on this page normally available from stock.

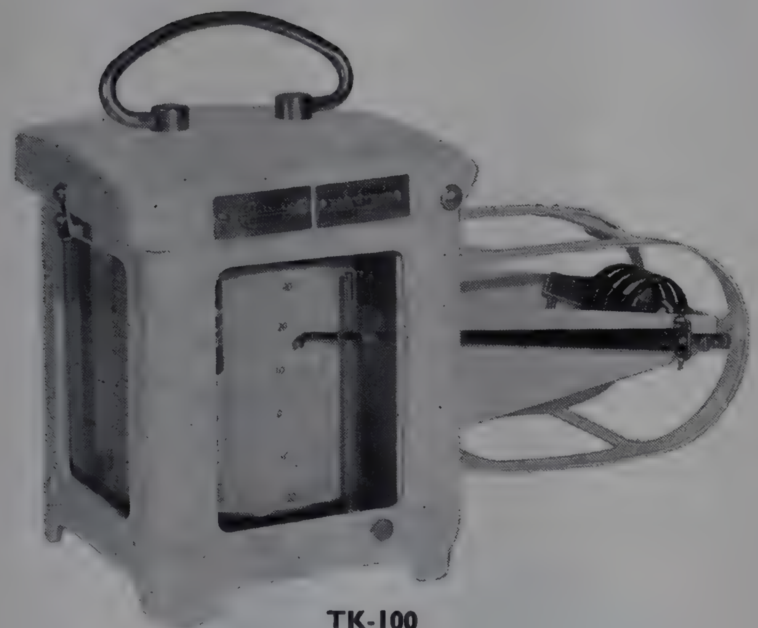
THERMOGRAPHS

STANDARD CHART RANGES °C

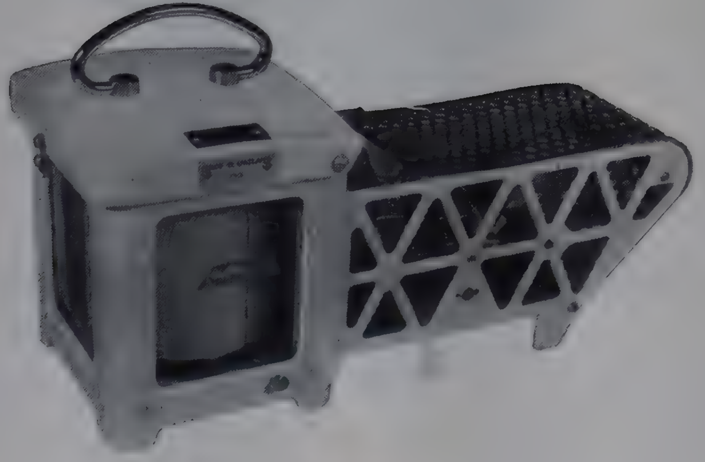
−10 to +40	20 to 70
0 to 50	30 to 80
10 to 60	50 to 100

TK-100

THERMOGRAPH, 24 hour recording, clockwork drive, conforming to BS 3231. For recording air temperature in the vicinity of the instrument. The temperature is measured by a bimetallic strip and recorded as an ink trace on a scaled chart. Accuracy is ±1% of full scale. A screw adjustment is provided to raise or lower the temperature range subject to a total span of 50°C being maintained. With 100 charts of a **range to be selected by the user,** bottle of ink and instructions for use. Case white stove enamel finished. Each **£38·00** *mN*



TK-100
TK-105



TK-150
TK-155

TK-105

THERMOGRAPH, as TK-100 but for **7 day recording. With 100 charts of a range to be selected by the user,** bottle of ink and instructions for use. Case white stove enamel finished ... ... Each **£38·00** *mN*

REPLACEMENT PARTS

TK-106	**Charts,** 24 hour recording, range as selected.	Box of 100	**£1·25**	*mN*
TK-107	**Charts,** 7 day recording, range as selected.	Box of 100	**£1·25**	*mN*

When ordering charts please specify range, selected from the ranges given above.

ACCESSORIES. See TK-164 to TK-178 below.

THERMOHYGROGRAPHS

TK-150

THERMOHYGROGRAPH, for 24 hour recording, with clockwork drive. Temperature and relative humidity, measured by a bimetallic strip and prepared hair respectively, are recorded as ink traces on a scaled chart. The temperature accuracy is ± 1% of full scale and the humidity accuracy is ±3% between 20 and 80% r.h. With 100 charts, two bottles of differently coloured ink and instructions for use. Case white stove enamel finished.

Range −10 to +40°C, 0 to 100% r.h. ...	Each	**£40·00**	*mN*
Range 0 to +50°C, 0 to 100% r.h. ...	Each	**£40·00**	*mN*
Range 10 to +60°C, 0 to 100% r.h. ...	Each	**£40·00**	*mN*

TK-155

THERMOHYGROGRAPH, as TK-150 but **for 7 day recording.** With 100 charts, two bottles of different coloured ink and instructions for use. Case white stove enamel finished.

Range −10 to +40°C, 0 to 100% r.h. ...	Each	**£40·00**	*m*
Range 0 to +50°C, 0 to 100% r.h. ...	Each	**£40·00**	*m*
Range 10 to +60°C, 0 to 100% r.h. ...	Each	**£40·00**	*m*

NOTE: When ordering Thermohygrographs please state the temperature range selected from those listed. Each instrument can be used only with the temperature chart selected at the time of purchase.

REPLACEMENT PARTS

TK-160	**Charts,** 24 hour recording, range as selected.	Box of 100	**£1·25**	*mN*
TK-162	**Charts,** 7 day recording, range as selected.	Box of 100	**£1·25**	*m*

When ordering charts please specify range, selected from the ranges given above.

ACCESSORIES FOR THERMOGRAPHS AND THERMOHYGROGRAPHS

TK-164	**Ink,** violet	Bottle	**£0·20**	*m*
TK-166	**Ink,** green	Bottle	**£0·20**	*m*
TK-170	**Pen,** short, for temperature trace ...	Each	**£0·25**	*m*
TK-172	**Pen,** long, for humidity trace	Each	**£0·25**	*m*
TK-176	**Change wheels,** to convert 24 hour to 7 day recording.	Set	**£0·75**	*m*
TK-178	**Change wheels,** to convert 7 day to 24 hour recording.	Set	**£0·75**	*m*

Items on this page normally available from stock except those coded *N.*

IP STANDARD THERMOMETERS

Specified in *IP Standards for Petroleum and its Products, Part 1*, published by the Institute of Petroleum.

List No.	Designation	Test	Scale span	Divisions	Immersion mm	Total length mm	Ten	Each
							£	£
TK-502	IP 1F	Cloud and Pour	−36°F to +120°F	2degF	108	225	**14·00**	**1·55**
TK-503	IP 1C	Cloud and Pour	−38°C to +50°C	1degC	108	225	**14·00**	**1·55**
TK-504	IP 2F	Low Cloud and Pour	−112°F to +70°F	2degF	76	225	**14·40**	**1·60**
TK-505	IP 2C	Low Cloud and Pour	−80°C to +20°C	1degC	76	225	**14·40**	**1·60**
TK-506	IP 3F	Demulsification	30°F to 220°F	1degF	Total	—	**13·60**	**1·50**
TK-507	IP 3C	Demulsification	−1°C to +105°C	0·5degC	Total	—	**13·60**	**1·50**
TK-509	IP 4C	Crude Oil Distillation	−4°C to +360°C	2degC	Total	310	**17·50**	**2·00**
TK-511	IP 5C	Low Distillation	−2°C to +300°C	1degC	Total	380	**24·50**	**2·75**
TK-513	IP 6C	High Distillation	−2°C to +400°C	1degC	Total	380	**24·50**	**2·75**
TK-514	IP 8F	Redwood Low	30°F to 110°F	0·5degF	65	340	**14·00**	**1·55**
TK-515	IP 8C	Redwood Low	0°C to 44°C	0·2degC	65	340	**14·00**	**1·55**
TK-516	IP 9F	Redwood Medium	100°F to 180°F	0·5degF	65	340	**18·00**	**2·00**
TK-517	IP 9C	Redwood Medium	37·8°C to 82°C	0·2degC	65	340	**17·50**	**1·90**
TK-518	IP 10F	Redwood High	170°F to 250°F	0·5degF	65	340	**18·00**	**2·00**
TK-519	IP 10C	Redwood High	76°C to 122°C	0·2degC	65	340	**17·50**	**1·90**
TK-521	IP 14C	Cold Test	−80°C to +20°C	0·5degC	Total	300	**17·50**	**1·90**
TK-522	IP 15F	Pensky-Martens Low	20°F to 230°F	1degF	57	280	**21·50**	**2·40**
TK-523	IP 15C	Pensky-Martens Low	−7°C to 110°C	0·5degC	57	280	**21·50**	**2·40**
TK-524	IP 16F	Pensky-Martens High	200°F to 700°F	5degF	57	280	**28·00**	**3·20**
TK-525	IP 16C	Pensky-Martens High	90°C to 370°C	2degC	57	280	**31·00**	**3·50**
TK-526	IP 17F	Wax Setting Point	100°F to 180°F	0·2degF	79	365	**24·50**	**2·75**
TK-527	IP 17C	Wax Setting Point	38°C to 82°C	0·1degC	79	365	**24·50**	**2·75**
TK-531	IP 20C	Aniline Point Low	−38°C to +42°C	0·2degC	50	410	**19·00**	**2·15**
TK-533	IP 21C	Aniline Point High	25°C to 105°C	0·2degC	50	410	**19·50**	**2·20**
TK-536	IP 23F	Reid Vapour Pressure	94°F to 108°F	0·2degF	Total	260	**31·00**	**3·50**
TK-537	IP 23C	Reid Vapour Pressure	34°C to 42°C	0·1degC	Total	260	**31·00**	**3·50**
TK-540	—	Abel oil cup	50°F to 150°F	1degF	—	228 approx.	**17·50**	**1·90**
TK-541	—	Abel oil cup	10°C to 65°C	0·5degC	—	228 approx.	**17·50**	**1·90**
TK-542	—	Abel water bath	90°F to 190°F	1degF	—	228 approx.	**17·50**	**1·90**
TK-543	—	Abel water bath	32°C to 88°C	0·5degC	—	228 approx.	**17·50**	**1·90**
TK-544	IP 28F	Cleveland	20°F to 760°F	5degF	25	300	**27·50**	**3·10**
TK-545	IP 28C	Cleveland	−6°C to +400°C	2degC	25	300	**27·50**	**3·10**

All items on this page normally available from stock (code *c*).

IP STANDARD THERMOMETERS—(continued)

List No.	Designation	Test	Scale span	Divisions	Immersion mm	Total length mm	Ten	Each
							£	£
TK-546	IP 29F	Kin Visc 68°F	66·5°F to 71·5°F †	0·1degF	Total	280	**68·00**	**7·60**
TK-547	IP 29C	Kin Visc 20°C	18·6°C to 21·4°C †	0·05degC	Total	280	**66·00**	**7·40**
TK-550	IP 31F	Kin Visc 100°F	97·5°F to 102·5°F †	0·1degF	Total	280	**62·00**	**7·00**
TK-551	IP 31C	Kin Visc 37·8°C	36·6°C to 39·4°C †	0·05degC	Total	280	**68·00**	**7·60**
TK-552	IP 32F	Kin Visc 210°F	208·5°F to 213·5°F †	0·1degF	Total	280	**70·00**	**7·80**
TK-553	IP 32C	Kin Visc 98·9°C	98·6°C to 101·4°C†	0·05degC	Total	280	**70·00**	**7·80**
TK-554	IP 33F	Kin Visc 32°F	29°F to 35°F	0·1degF	Total	280	**45·00**	**5·00**
TK-558	IP 35F	Kin Visc 140°F	137°F to 143°F †	0·1degF	Total	280	**58·00**	**6·60**
TK-563	IP 37C	Sludge	144°C to 156°C	0·2degC	100	270	**26·00**	**2·90**
TK-565	IP 38C	Pen and Duct	23°C to 27°C	0·1degC	Total	260	**29·00**	**3·30**
TK-566	IP 39F	Specific Gravity	30°F to 100°F	0·2degF	Total	440	**19·00**	**2·15**
TK-567	IP 39C	Density	−1°C to +38°C	0·1degC	Total	440	**19·00**	**2·15**
TK-569	IP 40C	Drop Point Low	20°C to 120°C	1degC	100	250	**22·00**	**2·45**
TK-571	IP 41C	Drop Point High	100°C to 230°C	1degC	100	250	**23·50**	**2·65**
TK-583	IP 47C	Loss on Heating	150°C to 175°C	0·5degC	Total	150	**21·50**	**2·40**
TK-609	IP 60C	Ring and Ball Low	−2°C to 80°C	0·2degC	Total	390	**19·00**	**2·15**
TK-611	IP 61C	Ring and Ball High	30°C to 200°C	0·5degC	Total	390	**24·50**	**2·75**
TK-612	IP 62F	Drop Point Special	20°F to 580°F	2degF	76	379 to 383	**25·50**	**2·85**
TK-613	IP 62C	Drop Point Special	−5°C to 300°C	1degC	76	379 to 383	**25·50**	**2·85**
TK-615	IP 63C	MP Petrolatum	32°C to 127°C	0·2degC	79	368	**28·00**	**3·20**
TK-616	IP 64F	Specific Gravity	−5°F to +215°F	0·5degF	Total	406	**21·50**	**2·40**
TK-617	IP 64C	Density	−20°C to +102°C	0·2degC	Total	406	**21·50**	**2·40**
TK-636	IP 74F	Abel oil cup wide range	−35°F to +160°F	1degF	61	310	**27·50**	**3·10**
TK-638	IP 75F	Abel water bath wide range	−25°F to +180°F	1degF	89	310	**27·50**	**3·10**
TK-640	IP 76C	Engler Viscosity	10°C to 55°C	0·5degC	93	240	**31·00**	**3·50**
TK-650	IP 81C	Solvents Distillation	98°C to 152°C	0·2degC	100	400	**33·00**	**3·70**
TK-656	IP 84C	Solvents Distillation	148°C to 202°C	0·2degC	100	400	**35·00**	**3·90**
TK-666	IP 89F	Softening Point	30°F to 350°F	1degF	Total	400	**23·00**	**2·60**
TK-668	IP 89C	Softening Point	−1°C to 175°C	0·5degC	Total	400	**23·00**	**2·60**

† These thermometers have a check scale.

All items on this page normally available from stock (code c)

THERMOREGULATORS and CONTACT THERMOMETERS

Liquid expansion devices for the thermostatic control of baths containing water or other liquids. Contact thermometers may also be used for controlling air oven temperatures.

NOTE: All apparatus listed on this page must be used in conjunction with a sensitive relay. For loads up to 20A a.c. electronic relay EC-780 is recommended.

TM-450

THERMOREGULATOR, liquid expansion type, borosilicate glass. Capable of controlling to 0·01degC over the range 0 to 100°C. With expansion bulb, sidearm reservoir with stopcock and fine adjustment screw head. The expansion bulb is normally filled with an inert expansion fluid such as toluene and the remainder of the thermometer with mercury to complete the electrical circuit for switching. Overall length including adjustment head 40 cm. Supplied empty but with instructions for filling and operating ... ... Each **£4·85** *a*

NOTE: Approximate capacity of TM-450 is 100 ml of sulphur free expansion fluid and 30 ml of triple distilled mercury.

REPLACEMENT PART

TM-452 Glass part only ... ... Each **£2·20**

ACCESSORIES

EC-780	**Electronic relay,** *Gallenkamp.*	For details and prices see entries in List No. sequence.
MF-932	**Mercury,** triple distilled.	

TM-475

CONTACT THERMOMETER, Jackson, mercury filled and sealed, U.K. Patent No. 660,221. A Beckmann type thermometer capable of controlling to ±0·01degC over the range 0 to 100°C. Coarse control of temperature operating point is achieved by transferring mercury between the internal reservoir and the bulb. Fine control is by means of a threaded adjusting head which controls the position of a contact wire in the thermometer capillary. The thermometer has a 50 division reference scale, for any given volume of mercury in the bulb, which represents an operating range of approximately 10degC. Overall length including adjustment head 36 cm.
Each **£8·25** *m*

ACCESSORY

EC-780 **Electronic relay,** *Gallenkamp.* For details and price see entry in List No. sequence.

TM-480

CONTACT THERMOMETERS, direct reading, adjustable, mercury filled and sealed. Capable of controlling to with 0·1degC. With two opal glass scales, the upper one for setting and the lower one reading the temperature. An adjusting head contains a magnetic coupling device to adjust the thermometer setting to the required temperature against the internal scale. Overall length including adjustable head 40 cm; immersion depth 15 cm.

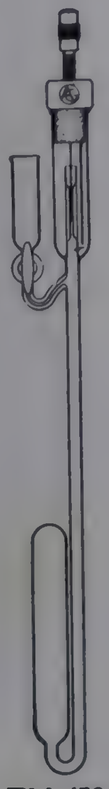
Scale range	0 to 50	100	200	350°C	
Subdivision	1	1	2	5degC	
Each	**£6·50**	**6·50**	**7·60**	**7·60**	c

ACCESSORIES

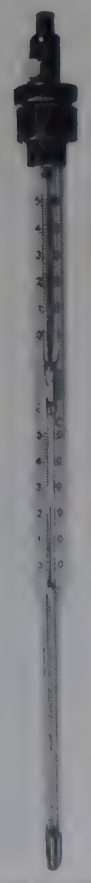
TM-482 **Protective casing,** metal, screwed ¾ in BSP.
Each **£3·80** c

EC-780 **Electronic relay,** *Gallenkamp.* For details and price see entry in List No. sequence.

TM-475



TM-450



TM-480

All items on this page normally available from stock.

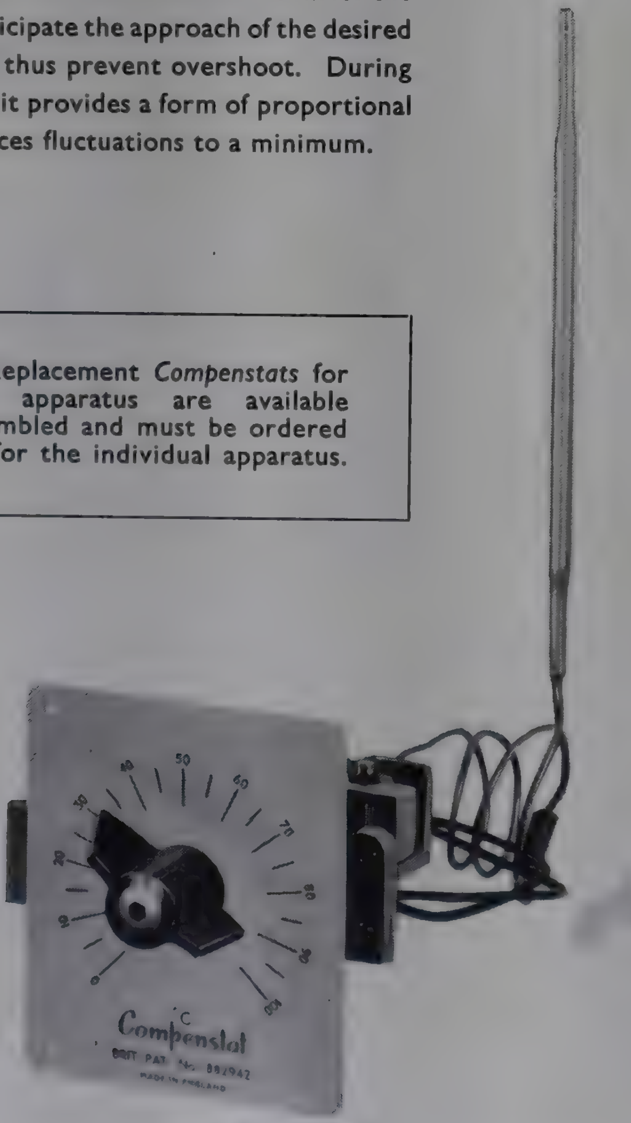
Compenstat† TEMPERATURE CONTROLLER

† Regd. Trade Mark (U.K. Patent No. 882,942)

The *Compenstat* hydraulic temperature controller is a *Gallenkamp* designed and manufactured thermostat which is suitable for fitting to a wide range of laboratory equipment. It is sensitive and stable and gives accurate and reliable temperature control when installed in accordance with simple instructions and is readily built into equipment because the sensing bulb is connected by a flexible capillary tube to the control head. The bulb position can therefore be chosen for maximum efficiency, while the head can be independently positioned to suit the overall design of the equipment.

The hydraulic *Compenstat* comprises basically a sensing bulb, a capillary connecting tube and a control head. The system is unaffected by barometric pressure variations. A scale plate calibrated in degC facilitates temperature setting. In operation the bulb is heated until the expansion of the filling liquid extends a bellows which actuates a microswitch and turns off the heaters. Compensation for ambient temperature effects on the control head is provided. Rapid temperature response is obtained by a heat feed-back system which consists of a heater fixed to the capillary tube. The heat feed-back enables the *Compenstat* to anticipate the approach of the desired temperature and thus prevent overshoot. During steady operation it provides a form of proportional control and reduces fluctuations to a minimum.

NOTE: Replacement *Compenstats* for *Gallenkamp* apparatus are available factory assembled and must be ordered specifically for the individual apparatus.



TM-515

- **Prepacked kits—easily installed**
- **Direct temperature scale**
- **Temperature fluctuation 0·25degC**
- **Good long term stability**
- **Ambient temperature compensation**

These *Compenstat* kits are for user installation in ovens, incubators, liquid baths, etc. not of *Gallenkamp* manufacture.
The performance of the equipment depends upon several factors, but if the instructions are carefully observed, there should be no difficulty in obtaining satisfactory results.

The *Compenstat* kit includes a small transformer to ensure the correct current through the capillary heater for a wide variety of main heater loadings.

The microswitch, which has single pole changeover contacts, is rated at 15A a.c. non-inductive. For higher loads and for all d.c. applications a relay must be used (see EC-780).

DIMENSIONS

Bulb	15 cm long, 6·4 mm diameter
Capillary	110 cm long
Head (overall)	3·5 cm high × 9 cm wide × 7 cm deep

TM-510

COMPENSTAT KIT, *Gallenkamp,* as specification, range 0 to 100°C. For use in incubators, ovens etc. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50**	*b*
For 200/210V	Each	**£17·50**	*b*
For 110/120V	Each	**£17·50**	*b*

TM-511

COMPENSTAT KIT, *Gallenkamp,* as TM-510 but range 40 to 250°C. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50**	*b*
For 200/210V	Each	**£17·50**	*b*
For 110/120V	Each	**£17·50**	*b*

TM-515

COMPENSTAT KIT, *Gallenkamp,* as specification, range 0 to 100°C. For use in water or oil baths. With $\frac{5}{16}$ in BSF union on capillary to make a liquid tight seal. Capillary length from head to union 34 cm; from union to bulb 10 cm. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50**	*b*
For 200/210V	Each	**£17·50**	*b*
For 110/120V	Each	**£17·50**	*b*

TM-516

COMPENSTAT KIT, *Gallenkamp,* as TM-515 but range 40 to 250°C. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50**	*b*
For 200/210V	Each	**£17·50**	*b*
For 110/120V	Each	**£17·50**	*b*

When ordering Compenstat Kits please state voltage and frequency of supply.

All items on this page normally available from stock.

GENERAL PURPOSE THERMOSTAT

TM-790

THERMOSTAT, general purpose, 20–110°C. An hydraulic thermostat for building into equipment where a fluctuation of nominally 5degC is adequate. Especially suitable for use as a safety thermostat. Incorporates a single pole switch for ON/OFF switching of up to 20A at 250V non-inductive loads. Not recommended for currents below 0·5A. With locating lugs and suitable for fixing by a screwed nosepiece to panels up to 6·5 mm thickness. Capillary length approximately 100 cm. Supplied with knob and escutcheon ... ... Each **£3·15** *c*

TM-790

BIMETAL THERMOSTATS

These thermostats operate by means of a helix of bimetal fixed at one end to a stem and the other end to an operating rod. A change of temperature causes the helix to twist and this motion is transmitted to the switch within the head.

The switch differentials quoted are the changes of temperature which will cause the thermostats to open or close, and not the performance of the apparatus to which they are fitted.

Although set for optimum performance when supplied, the contact pressure, and hence the differential can be increased or decreased.

The thermostats have arbitrary scales and stems, are virtually rustless and only require a protective pocket if inserted through the side of a bath, below the liquid level.

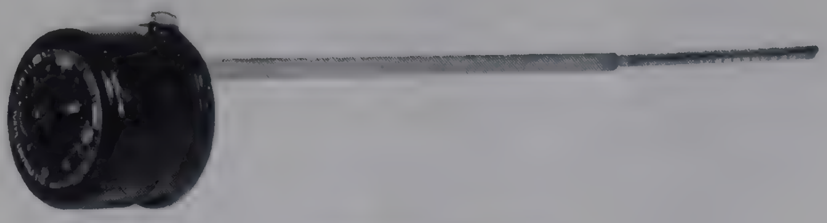
For the best results a relay should be used, since a low control current results in close control and satisfactory service over long periods of time. A relay is essential for Type TS3. Type TS8 will operate up to 2·5A a.c. or 0·1A d.c. at 250V without relay.

Suitable relays see EC-780 and ED-101 in List No. sequence.

List No.	AEI Type	Max. temp. °C	Range of adjustment °C	Fluctuation degC	Stem lengths cm	Each	
TM-800	TS1	300	40	0·5	15	£ **6·05**	*m*
TM-810	TS2	300	120	0·5	15	**6·05**	*m*
TM-812					30	**6·73**	*m*
TM-820	TS3	150	40	0·2	25	**6·45**	*m*
TM-830	TS8	300	250	1·0	25	**8·05**	*m*

All stock instruments have contacts normally closed, opening with temperature rise.

AQUARIUM THERMOSTAT see BL-135 in List No. sequence.



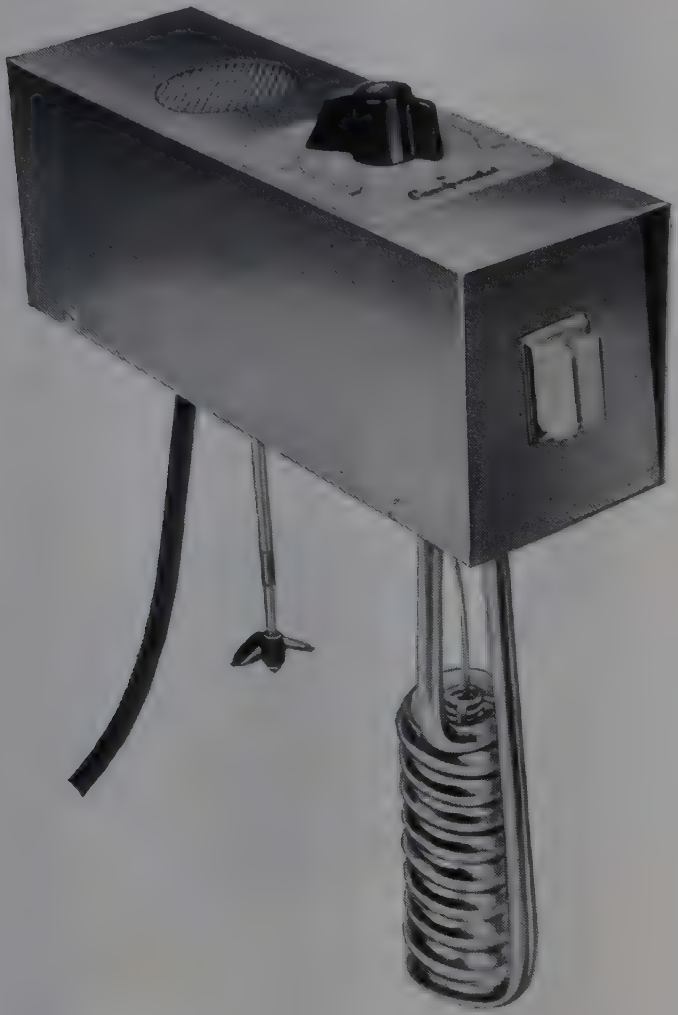
TM-800 to TM-830

ACCESSORY

TM-835 **Pockets**, brass, electro-tinned, for *AEI* TS thermostats.

Length, approx.	15	25	30 cm	
Each	**£1·10**	**1·37**	**1·37**	*m*

All items on this page normally available from stock.



TM-840

OPERATION

The Thermo Stirrer is mounted on a filled water or oil bath by means of either the retort rod fitting or the adjustable clamp (see Accessories). The operator sets the required control temperature on the *Compenstat* scale and switches on the mains supply. The Thermo Stirrer agitates the bath liquid continuously and heats it to the control temperature. A load indicator lamp shows the ON/OFF cycling of the heater which occurs as the control temperature is maintained.

DIMENSIONS	H		W		D
Control box	12	×	8	×	28 cm
Overall	30	×	8	×	28 cm
Minimum essential depth of bath					18 cm
Clearance between underside of case and water level					
Maximum					5·0 cm
Minimum					1·5 cm
Weight					3 kg
Power rating, max.					1500W

Gallenha

For converting suitable tanks into temperature contr water or oil baths. Both models incorporate hea thermostats and efficient stirrers which can be conve into pumps for the external circulation of water at contr temperatures.

THERMO STIRRER I

- **Temperature controlled by** *Compenstat*
- **Stainless steel outer case**
- **1500W sheathed immersion heater**

PERFORMANCE

The powerful stirrer and heater combine with the sensitive *Compenstat* controller to provide good performance to even the simplest bath. For example, glass tanks filled with liquid can be controlled over a wide range of temperature **with a fluctuation of 0·4degC or less** and a variation of 0·3degC or less in the working space.

BATH DESIGN

For optimum performance from the Thermo Stirrer, the following points are relevant when selecting the bath:

1. The bath should be regular in shape with comparable length, breadth and depth.
2. It should be large enough to allow free circulation around the load (in this connection it is often useful to incorporate a "false floor").
3. For use above 50°C, it should be insulated and fitted with a cover to reduce evaporation losses.
4. For use at or near ambient temperature, a cooling coil should be used.

TM-840

THERMO STIRRER I, *Gallenkamp*, as specification including *Compenstat*, motor driven stirrer, and sheathed heater but **without retort rod mount or adjustable clamp.** For single phase a.c. supplies only.

For 220/240V	Each	**£31·00**	*b*
For 200/210V	Each	**£31·50**	*bN*
For 110/120V	Each	**£31·50**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-363	**Stirrer motor ... ...**	For prices see entries in List No. sequence.
WF-365	**Heating element, 1500W.**	

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

TM-844	**Retort rod mount.** This fitting enables the unit to be mounted from a retort stand or scaffold by means of a bosshead	Each	**£1·05**	*b*
TM-846	**Clamp, adjustable.** This clamp enables the unit to be mounted on the rim of a water bath. Adjustable for wall thicknesses between 0·5 cm and 3 cm ...	Each	**£1·90**	*b*
TM-848	**Constant level device,** for clamping to water bath or tank	Each	**£3·50**	*f*
WF-376	**Pump,** for circulating water to external apparatus ...	For full details and prices see entries in List No. sequence.		
TB-600	**Tanks,** *Pyrex brand* glass ...			

Items on this page normally available from stock except those coded *N*.

ERMO STIRRERS

emperature range from ambient plus 5degC to 100°C
uiet and reliable operation
itable for a wide range of water bath sizes
irect reading thermostats

THERMO STIRRER 2

- **Temperature controlled by contact thermometer and solid state relay**
- **Stainless steel outer case**
- **1000W heater on standard model. 1500W accessory heater available**

PERFORMANCE

With the standard 1000W heater this Thermo Stirrer will provide high performance in simple baths. For example, glass tanks filled with liquid can be controlled from ambient to 90°C **with fluctuation of 0·05degC or less** and a temperature variation of 0·3degC or less. Long term stability is excellent.

The accessory 1500W heater TM-874 (available only for 200/210 and 220/240V) is for use with larger baths and heavier work loads. It replaces the standard heater in use.

BATH DESIGN

The notes concerning bath design on the opposite page apply also to this Thermo Stirrer.

OPERATION

Three heater powers and switching modes may be selected to allow adjustment for minimum temperature fluctuation. The three settings are:

Full power switched on and off by the thermostat.
Half power switched on and off by the thermostat.
Half power on continuously and the other half power switched on and off by the thermostat.

DIMENSIONS

	H		W		D	
Overall, without contact thermometer	26	×	12	×	21	cm
Overall, with contact thermometer fitted	33	×	12	×	21	cm
Minimum essential depth of bath					16	cm
Clearance between underside of case and water level						
Maximum					7	cm
Minimum					3	cm
Weight					2	kg
Power rating, max.					1000W	
Power rating, with 1500W accessory heater					1500W	

Gallenkamp
THERMO STIRRER

TM-860 with TM-870 and WF-376

TM-860

THERMO STIRRER 2, *Gallenkamp*, as specification with motor driven stirrer, 1000W heater, and solid state electronic switching. Complete with contact thermometer range 0–100°C. For single phase a.c. supplies only.

For 220/240V 50 Hz	Each	**£41·00**	*b*
For 200/210V 50 Hz	Each	**£41·50**	*bN*
For 110/120V 60 Hz	Each	**£41·50**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

TM-864	**Heating element,** 1000W	Each	£4·00	*b*
TM-866	**Contact thermometer,** range 0–100°C.	Each	£8·75	*b*
WF-363	**Stirrer motor.** For details and prices see entry in List No. sequence.			

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

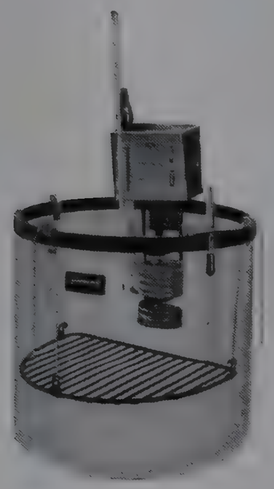
TM-870	**Cooling coil,** with fixing plate	Each	£3·90	*b*
NOTE:	**This accessory increases the minimum essential working depth of the bath to 20 cm.**			
TM-872	**Holder for mercury in glass thermometer.**	Each	£0·60	*b*
TM-874	**Heater,** 1500W **not available for 110/120V.**	Each	£4·00	*b*
TM-844	**Retort rod mount.** For price see entry in List No. sequence.			
TM-848	**Constant level device** ...	For full details and prices see entries in List No. sequence.		
WF-376	**Pump,** for circulating water to external apparatus ...			
TB-600	**Tanks,** *Pyrex brand* glass ...			

Items on this page normally available from stock except those coded *N*.

Gallenkamp APPARATUS THERMOSTATICALLY CONTROLLED BY THERMO STIRRER OR *Compenstat*

THERMOSTATIC WATER BATH

Thermo Stirrer controlled



A convenient and accurate bath for general laboratory testing and many standard methods including:

IP 49	Penetration of bitumen
IP 60	Specific refractivity
IP 160	Specific gravity and density (by hydrometer)
IP 189	Specific gravity and density (by bicapillary pyknometer)
IP 190	Specific gravity and density (by pyknometer)

Details see WF-850 et seq. in List No. sequence.

BS OVENS

Compenstat (solid state) controlled

A range of attractive, extremely high performance laboratory drying and sterilising ovens meeting the exacting requirements of BS 2648 and BS 3421.

Operating temperatures up to 300°C maximum can be set on the direct reading *Compenstat* (solid state) control. An independent safety thermostat is set about 5degC higher to take over should the main thermostat fail.

Details see OV-160, OV-330, OV-420 and OV-440 in List No sequence.

THERMOSTATIC WATER BATH

Thermo Stirrer controlled

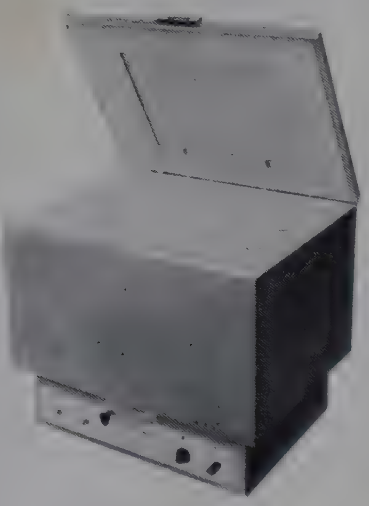
Gallenkamp

An inexpensive, metal bath with stainless steel interior, suitable for many determinations using test tubes or small flasks including various serological and methylene blue and resazurin tests.

Details see WF-360 et seq. in List No. sequence.

ORBITAL INCUBATOR

Compenstat controlled



A precise temperature controlled incubator with powerfully driven orbiting platform for growing cultures of micro-organisms and tissue cells. Applications in microbiology, botany, zoology, virology, bacteriology, biochemistry and metallurgy.

Details see IH-400 et seq. in List No. sequence.

THERMOSTATIC WATER CIRCULATORS

For pumping temperature controlled water and other fluids through external apparatus.

Applications include maintaining constant temperatures for viscosity, spectrophotometry, polarimetry and refractometry measurements, and circulation through water jackets, condensers and constant temperature coils.

STANDARD MODEL

Temperature range	ambient to 80°C
Temperature fluctuation	±0·1degC
Pumping rate at zero head	5 litres/min
Maximum head	2 metres
Overall dimensions	33×17×30 cm high
Weight, net	9 kg

TM-970

THERMO-CIRCULATOR, *Churchill*, as specification, comprising a 1·7 litre reservoir with 250W heater, pump, direct reading temperature indicator-controller, and cooling coil for operation near ambient temperatures. For 200/240V 50 Hz single phase supplies.

Each **£62·00** *m*

TM-970

REFRIGERATED PROBES see RJ-450 et seq. in Addenda

REFRIGERATED MODEL

Temperature range	−5 to +60°C
Temperature fluctuation	±0·2degC
Pumping rate at zero head	4·5 litres/min
Maximum head	2 metres
Heat extraction rate of circulating water at 0°C with operating temperature of 20°C	200 Kg. cal/hr approx.
Overall dimensions	51×31×60 cm high
Weight, net	46 kg

TM-975

THERMO-CIRCULATOR, *Churchill*, as specification, comprising 4 litre reservoir, $^1/_5$ hp refrigeration unit, 500W heater and direct reading temperature indicator-controller. Suitable for use in ambient temperatures up to 30°C. For 220/240V 50 Hz single phase supplies.

Each **£183·00** *fN*

TM-975

Gallenkamp REFRIGERATED THERMOSTATIC BATH

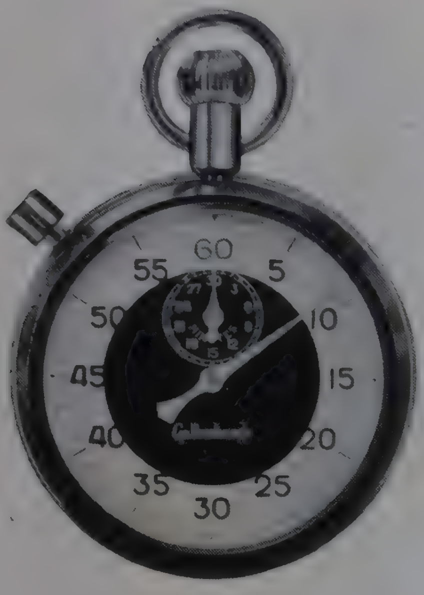
with integral pump to circulate bath fluid to external apparatus

- **Bath capacity 35 litres**
- **Temperature range −20 to +50°C**
- **Temperature fluctuation ±0·5degC**
- **Stainless steel interior**

For full details and price see WF-721 in List No. sequence.

WF-721

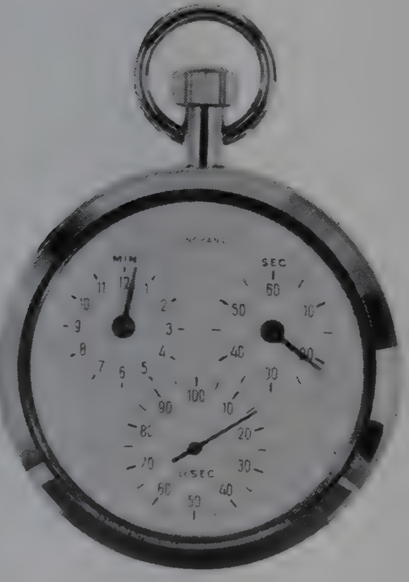
STOPWATCHES



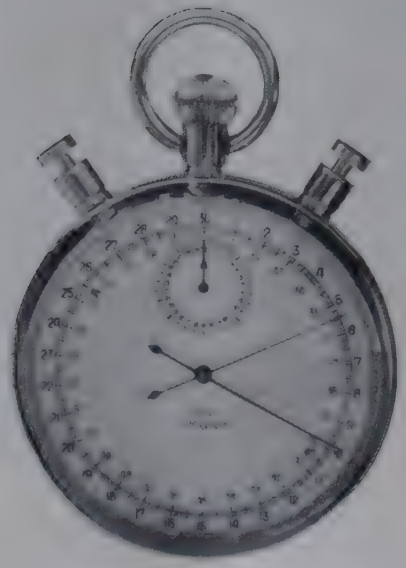
TR-015

TR-022

TR-030



TR-037



TR-050

***TR-015**

STOPWATCH, general purpose, 30 minutes total, with 60 second dial divided in 0·2 second intervals. Start and stop by consecutive pressures on the winder and reset by press movement at the side. Seven jewel lever movement in chromium plated case ... ... Each **£8·25** *m*

TR-022

STOPWATCH, general purpose, 15 minutes total, with 30 second dial divided in 0·1 second intervals. Start, stop and reset by consecutive pressures on the winder. Seven jewel lever movement in chromium plated case. Each **£8·75** *m*

***TR-030**

STOPWATCH, precision, 60 minutes total, with three separate dials for minutes, seconds and 0·1 seconds. Start, stop and reset by consecutive pressures on the winder. The 0·1s indicator stops only on the graduations thus facilitating exact readings. Seven jewel, shock resistant lever movement, in chromium plated case. Each **£15·00** *m*

***TR-037**

STOPWATCH, precision, 12 minutes total, with three separate dials for minutes, seconds and 0·01 second intervals. Start, stop and reset by consecutive pressures on the winder. The 0·01s indicator stops only on the graduations thus facilitating exact readings. Fifteen jewel, shock resistant movement in water protected chromium plated case ... ... Each **£22·50** *m*

***TR-050**

STOPWATCH, multiple timing, split second with main 30 second dial subdivided in 0·1 seconds and subsidiary dial for up to 30 minutes. Rated and calibrated to NPL standards for certification. The watch has two coaxial seconds hands, which can be operated together by the right hand button as on a conventional watch. In addition one hand can be stopped and made to rejoin the other, which runs steadily, by pressing the left hand button. A number of concurrent tests can therefore be timed with one watch. The initial cost and subsequent expenditure on checking and rating is far less than when a number of watches are used, and there is no need to apply corrections for comparative timings as is the case when separate watches are used. The central knob is used to wind the watch and return the hands to zero. With dial cover ... ... Each **£47·00** *m*

All items on this page normally available from stock.

TR-060

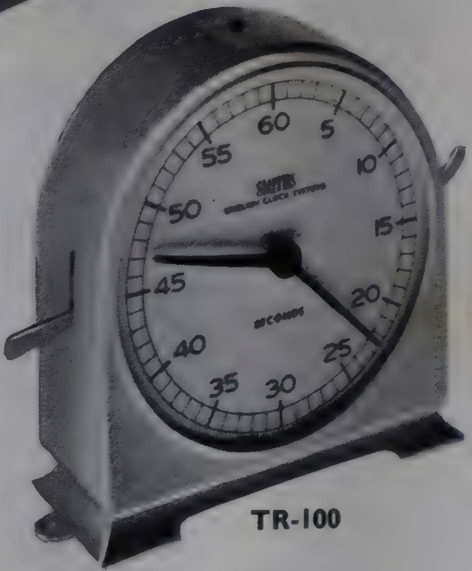
STOPWATCH HOLDER, with push button operation for start, stop and reset by a simple mechanism which is adjustable for different size watches and which always gives a positive action. Comprises an aluminium die casting finished in hard enamel with polished plated fittings. **Without stopwatch** ... ... Each **£2·75** *f*

TR-060 (with stopwatch)

STOPCLOCKS

TR-100

STOPCLOCK, *Smiths,* with two hands indicating 60 minutes and 60 seconds total respectively on a 10 cm diameter dial. There is a stop and start lever on the left hand side and a reset lever on the right. The clock is spring driven and will run for about 30 hours with one winding. The dial is protected by a cover glass and the stove enamelled case has holes for securing to the bench. Each **£3·55** *f*



TR-100

***TR-110**

STOPCLOCK, with two hands indicating 60 minutes and 60 seconds total respectively on a 10 cm diameter dial. With start, stop and reset push buttons on the top of a plastics case. The clock is spring driven and will run for about 4 hours with one winding. The dial is protected by a plastics cover and the case is fitted with a foot for bench mounting ... ... Each **£6·65** *m*

TR-110

TR-120

STOPCLOCK, *Pye,* with two hands indicating 60 minutes and 60 seconds total respectively, on a 14 cm diameter dial, and with a third index pointer operated by knurled knob in the centre of the glass window. Minute hand set by one control knob while both hands started or stopped by a side lever. Spring driven lever movement which will run for about 30 hours with one winding. In plastics case with chromium plated bezel and dial cover, and stainless steel foot. For bench standing or wall mounting. Each **£8·00** *f*

TR-125

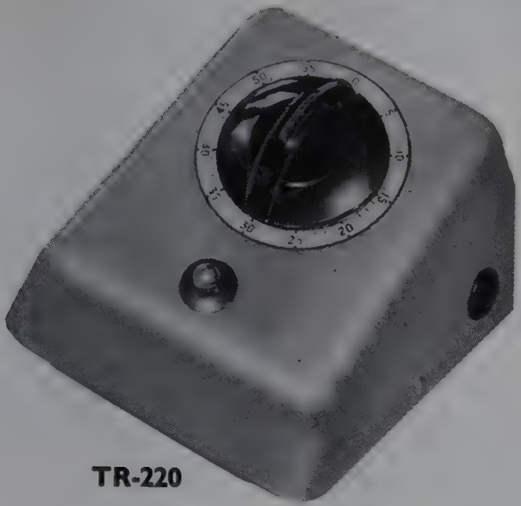
STOPCLOCK, *Pye,* indicating 60 seconds total on the main 14 cm diameter dial with a subsidiary dial indicating 60 minutes total. Start and stop by side lever movement and reset by depressing a plunger above the main dial. Spring driven lever movement which will run for about 30 hours with one winding. In plastics case with chromium plated bezel and dial cover, and stainless steel foot. For bench standing or wall mounting. Each **£9·00** *f*

TR-120

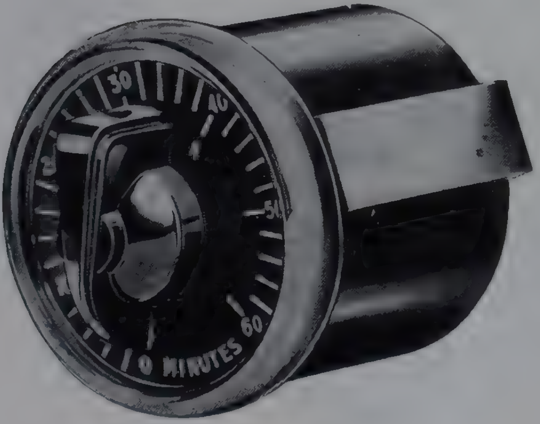
WALL CLOCKS see FW-638 and FW-640 in List No. sequence.

All items on this page normally available from stock.

TR-165



TR-220



TR-262

MINUTES
VENNER
3
5
10
15
20
25
30
35
40
45
50
55
60

TR-265

INTERVAL TIMERS

TR-150

INTERVAL TIMER, *Smiths*, for timing any period up to 60 minutes, the end of the period being signalled by a long bell ring. With indicator which is turned to the required period thereby winding and starting the clock mechanism. In plastics case with 5 cm diameter dial. Each **£1·85** *m*

TR-160

INTERVAL TIMER, *Smiths*, for timing any period up to 60 minutes, the end of the period being signalled by a long bell ring. With indicator which is turned to the required period thereby winding the spring driven lever movement and starting the clock. In metal case with 10 cm, diameter dial ... ... Each **£3·75** *m*

TR-165

INTERVAL TIMER, *Smiths*, for timing any period from ¼ minute to two hours, the end of the period being signalled by a ten second bell ring. The period required is set by a control knob which moves the minute and second pointers. The spring driven lever movement is wound by one side lever while the other side lever energizes the alarm. One winding enables the clock to run for 30 hours. In metal case with 9 cm diameter dial. Each **£3·75** *m*

PROCESS TIMERS

MANUAL ON, AUTOMATIC OFF

TR-220

PROCESS TIMER, spring driven, desk or wall mounting for switching off electrical apparatus after an elapsed time of up to 60 minutes. Incorporates a robust clock mechanism and a 6 cm diameter dial on which the required period is set by turning the central indicator. In plastics case with indicator lamp and double pole 15A switch. For 200/250V a.c. supplies ... ... Each **£6·80** *m*

TR-262

PROCESS TIMERS, *Venner*, spring driven, surface mounting, for switching off electrical apparatus after an elapsed time, and, simultaneously, to give visible or audible warning by connection to suitable lamp or bell circuit. Incorporates a spring operated movement with a 7·5 cm dia. dial on which the required period is set by turning the central indicator to an adjustable stop. With 5A single pole change-over switch for 250V a.c. or 24V d.c. supplies.

Time range	0–60 minutes	0–6 hours	
Each	**£9·00**	**9·00**	*m*

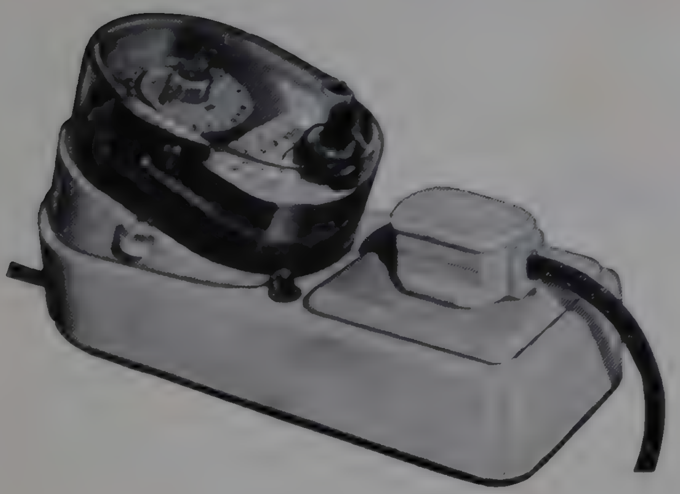
TR-265

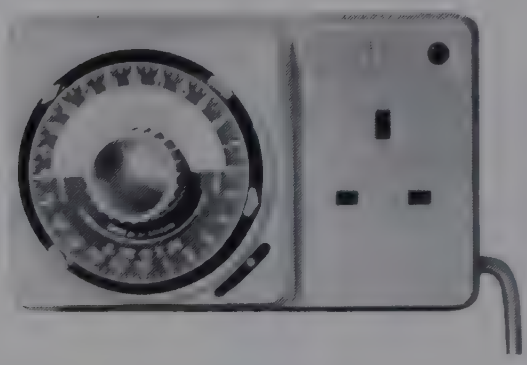
PROCESS TIMERS, *Venner*, electrically driven, surface mounting, for switching off electrical apparatus after an elapsed time. This synchronous motor driven timer is operated by a push button which also indicates elapsed time. The timing interval is set in a lockable pointer. The timer resets automatically after each cycle. With 15A changeover contacts, for 200/250V 50 Hz single phase supplies.

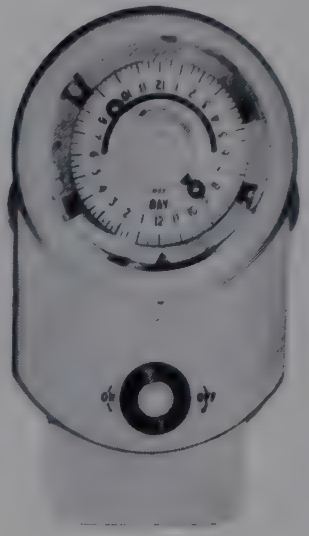
Timing range	3–60 minutes	1–20 hours	3–60 hours	
Each	**£10·17**	**10·17**	**10·17**	*m*

All items on this page normally available from stock.

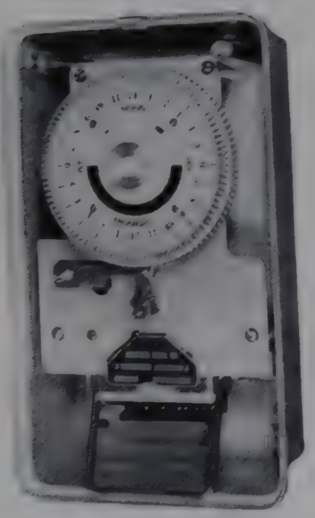
DAILY CYCLE SWITCHES


TR-330


TR-295


TR-300

TR-340


TR-360

All models have

- **Self starting synchronous electric motors for operation on 200/250V 50 Hz frequency controlled mains**
- **24 hour dials divided every ¼ hour**

The mains connection to all models is by cable.

All models except TR-360 have a manual override switch.

† **Time Switch TR-360** is for multiple switching by means of 96 tabs at 15 minute intervals round the dial. These tabs are easily raised, when each provides a 15 minute ON period, adjacent raised tabs providing continuous ON periods. The timer is thus very versatile for many laboratory purposes and can provide regular or irregular switching in any multiple of 15 mins throughout the 24 hours.

List No.	Timing levers	Minimum switching period ON/OFF (minutes)	Output connection	Rating (A)	Day selector	Indicator lamp	Mounting	Each	
								£	
TR-295	2 pair	60/60	13A 3-pin socket	13	No	Yes	Wall or Bench	5·40	*m*
TR-300	2 ,,	60/30	Cable	30	No	No	Wall	5·75	*m*
TR-314	2 ,,	30/15	Cable	30	Yes	No	Wall	6·40	*m*
TR-330	2 ,,	30/15	13A 3-pin socket	13	No	Yes	Bench	7·10	*m*
TR-340	2 ,,	30/15	3 separate cables	$\begin{cases}2\times5\\1\times15\end{cases}$	Yes	Yes	Wall	11·90	*m*
TR-360	96 tabs†	15/15	Cable	10	No	No	Wall	13·75	*m*

† see above.

All items on this page normally available from stock.

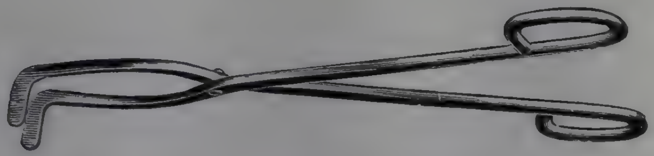
Gallenkamp TITRATION APPARATUS

Gallenkamp
TITRATION POTENTIOMETER
potentiometric
differential
dead stop
off
titration
sensitivity
balance
calibration
ext
meter

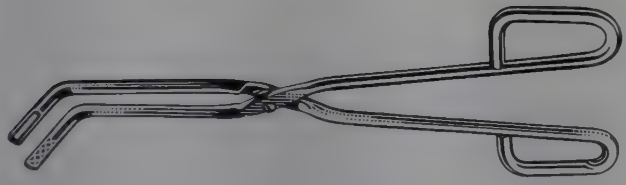
EJ-890

EJ-890	Titration potentiometer.
EJ-920 and EJ-925	Titration stand assemblies with or without hotplate.
EJ-930	Microtitration apparatus.
FV-150 to FV-173	Titration benches.

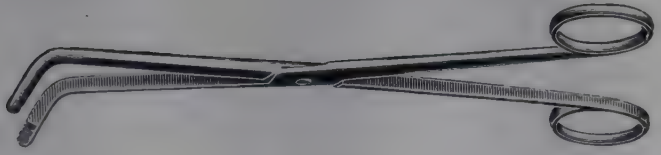
For full details and prices see entries in List No. sequence. See also page headings **Burettes, Flasks** and **Pipettes.**



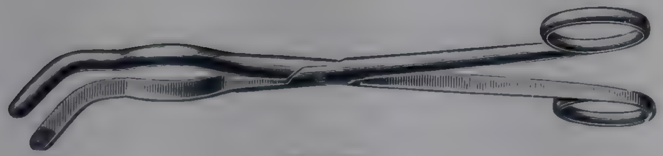
TS-212
TS-214
TS-218



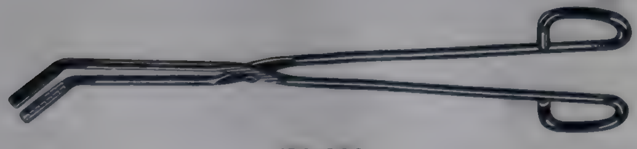
TS-216



TS-220
TS-224



TS-222
TS-226



TS-230

TONGS

TS-212

TONGS, crucible, blackened steel, with bow, student's pattern. Length 20 cm ... Ten **£1·80** Each **£0·25** c

TS-214

TONGS, crucible, brass, with bow and flattened wire hinge. Length 20 cm ... Ten **£2·90** Each **£0·35** c

TS-216

TONGS, crucible, stainless steel, straight, with flattened wire hinge. Length 20 cm.
Ten **£4·60** Each **£0·51** c

TS-218

TONGS, crucible, stainless steel, with bow and flattened wire hinge. Length 20 cm.
Ten **£4·60** Each **£0·51** c

***TS-220**

TONGS, crucible, stainless steel, straight, with forged scissors type hinge. Length 20 cm.
Ten **£12·60** Each **£1·40** c

***TS-222**

TONGS, crucible, stainless steel, with bow and forged scissors type hinge. Length 20 cm.
Ten **£12·60** Each **£1·40** c

TS-224

TONGS, crucible, stainless steel as TS-220, fitted with platinum shoes, straight. Length 20 cm.
Each **£19·50** *m*

TS-226

TONGS, crucible, stainless steel as TS-222, fitted with platinum shoes, with bow. Length 20 cm.
Each **£19·50** *m*

TS-230

TONGS, furnace, blackened steel, straight with flattened wire hinge. Length 38 cm.
Ten **£4·20** Each **£0·48** c

All items on this page normally available from stock.

TONGS

TS-240

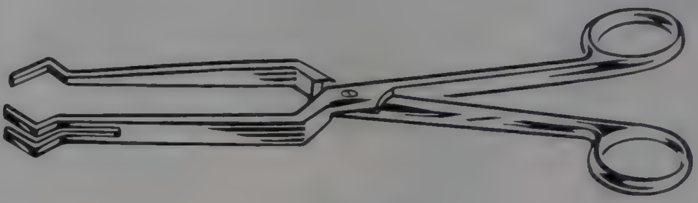
TONGS, furnace, Ward pattern, stainless steel, for handling a wide variety of crucibles, etc. especially in tube furnaces. Operated by thumb action with one hand and fitted with a circular shield to protect the hand against radiation from the furnace.

Length to shield	41	56 cm	
	16	22 in	
Overall length	59	74 cm	
	23	29 in	
Each	£4·60	5·20	c

TS-240

***TS-250**

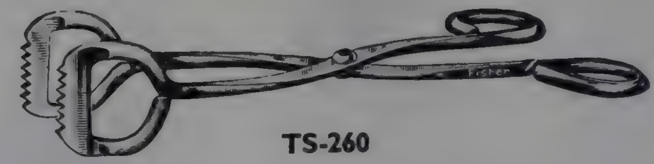
TONGS, general purpose, stainless steel. With scissor hinge and finger claws giving a firm but sensitive three point grip, suitable for test tubes, electrodes, thermometers, small flasks and beakers, slides, etc. Overall length 21 cm ... ... Each **£1·50** *b*



TS-250

TS-260

TONGS, *Fisher,* **general purpose,** dull plated mild steel. These tongs have a wide variety of applications and will hold thin pieces of paper, tubes of 10 mm diameter or more or small beakers up to 150 ml. Overall length 19 cm with 2·5 cm serrated jaws. Six **£4·77** Each **£0·93** *f*

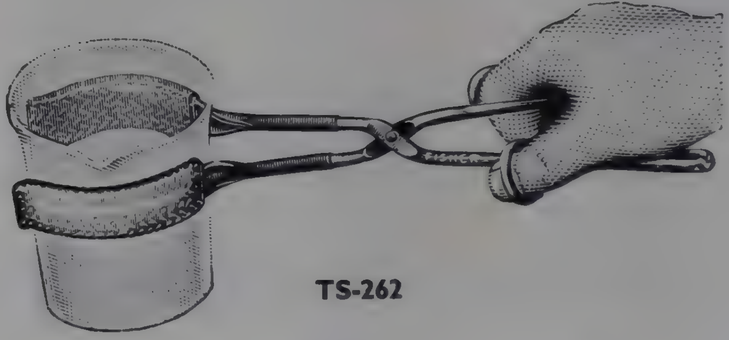


TS-260

TS-262

TONGS, *Fisher,* **for beakers,** stainless steel. These tongs will firmly grip and safely incline any beaker from 100 to 1500 ml. The 2·5 cm wide jaws are lined with replaceable asbestos covers which prevent slipping and thereby reduce the risk of breakage. Overall length 33 cm ... ... Each **£2·11** *f*

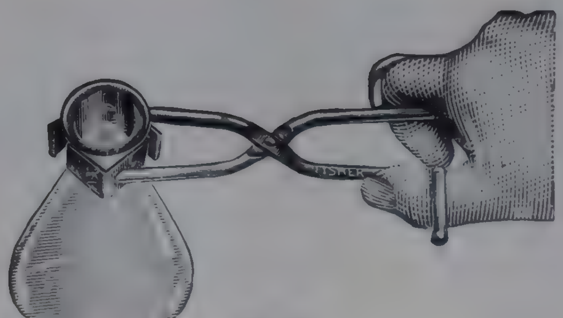
TS-263 Asbestos jaw covers, replacement for tongs TS-262 Pair **£0·16** *f*



TS-262

TS-264

TONGS, *Fisher,* **for flasks,** stainless steel. These tongs will firmly grip flasks of any shape from 100 to 2000 ml. One of the rectangular V-shaped jaws is smaller than the other ensuring a safe grip. The tong handles extend beyond the finger holds thus ensuring the entire weight of the flask is supported by the palm of the hand. Overall length 23 cm ... ... Each **£2·11** *f*

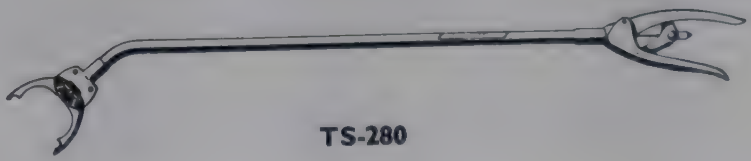


TS-264

TS-280

TONGS, REMOTE HANDLING, *Cee-Vee,* a long-arm reacher. The cork-lined jaws are so designed that various sized articles may be picked up safely. Maximum jaw opening 6·3 cm.

Length of arm	75	120	210 cm	
Each	£3·10	3·75	5·50	m



TS-280

All items on this page normally available from stock.

TOOLS

TT-040

TT-040
CLAMP, 'G', drop forged steel frame, with machine cut square threaded steel screw. Fitted with drop handle and swivel shoe. Opening 10 cm ... ... Each **£1·45** *m*

TT-070

TT-075

TT-070
DRILL, electric, variable speed, with $\frac{3}{8}$ in 3-jaw key chuck and simple finger control to provide speeds continuously variable between 900 and 3000 rev/min. Load 340W. Net weight 1·5 kg. For 230/250V a.c. single phase supplies ... ... Each **£15·00** *f*

ACCESSORY

TT-075 Drill stand, heavy duty, to accept drill TT-070. With depth control stop. Overall height 75 cm, depth of feed 7 cm, maximum height between chuck and table 50 cm. Each £7·00 *f*

TT-080

TT-080
DRILL BRACE, hand, capacity 0 to $\frac{1}{4}$ in, with double pinion, ball thrust and machine cut gears. In iron frame with polished hardwood handle... ... Each **£2·20** *m*

TT-082
DRILLS, high speed steel, set of seven $\frac{1}{16}$ to $\frac{1}{4}$ in by $\frac{1}{32}$ in, in metal box ... ... Set **£0·90** *m*

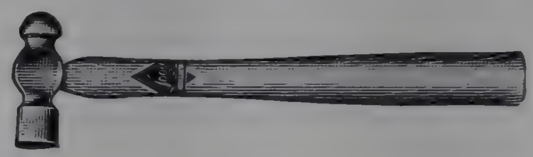
TT-110
FILE, round, bastard cut, length 20 cm, with handle. Ten **£2·40** Each **£0·31** *m*

TT-112
FILE, three square, second cut, length 15 cm, with handle ... ... Ten **£2·60** Each **£0·33** *m*

TT-130

TT-130
HACKSAW, adjustable tubular frame for 9 to 12 in blades ... ... Each **£1·13** *m*

TT-131
BLADES, hacksaw, high speed steel, length 12 in, width 0·5 in, thickness 0·025 in, 24 teeth per inch. In pack of 12. 10 packs **£17·00** Pack **£1·90** *m*


TT-150

TT-150
HAMMER, engineers, with ball pein and hickory handle. Weight $\frac{1}{2}$ lb ... ... Each **£0·70** *m*

TT-160

TT-160
KNIFE, trimming, with 5 cm reversible steel blade rigidly held in a two part diecast alloy handle. With five spare blades inside handle and blade guard. Each **£0·33** *m*

TT-200

TT-200
MIRROR, dental type, 25 mm dia. mirror with anodised aluminium handle, 15 cm long overall ... Each **£0·30** *m*

TT-250

TT-250
PLIERS, combination, with knurled insulated handles, length 17·5 cm ... ... Each **£0·87** *m*

TT-254

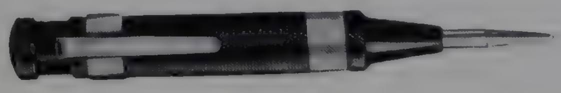
TT-254
PLIERS, snipe nose, insulated handle, length 14 cm. Each **£0·80** *m*

All items on this page normally available from stock.

TOOLS

TT-256

TT-256
PLIERS, side cutting, length 12·5 cm ... Each **£1·00** *m*



TT-280

TT-280
PUNCH, centre, automatic, with removable point. Impact pressure adjustable from 5 to 30 lb. Length 12 cm, with pocket clip ... ... Each **£1·00** *m*

TT-340

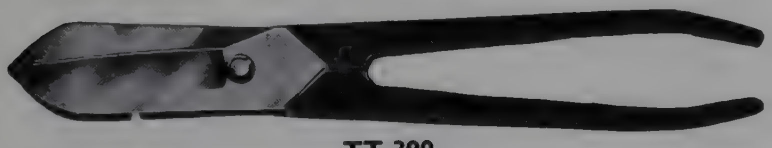
TT-340
SCREWDRIVERS, electricians', fully insulated, with plastics handle.

Blade length	7·5	10	15	20 cm	
Blade width	3	3	4	5 mm	
Each	**£0·30**	**0·30**	**0·35**	**0·45**	*m*

TT-344
SCREWDRIVER, heavy duty, 15 cm blade, 10 mm wide. Each **£0·65** *m*

TT-350
SCREWDRIVERS, Phillips headed, with plastics handle.

Point size	1	2	
Blade length	7·5	12·5 cm	
Each	**£0·33**	**0·40**	*m*



TT-390

TT-390
SNIPS, tinmans', length 20 cm ... Each **£0·65** *m*

TT-420

TT-420
SOLDERING IRON, miniature, 15W, with nickel-plated bit, 4 mm diameter tip. Overall length 18 cm. For 220/240V supplies ... ... Each **£1·63** *m*

TT-430
SOLDERING KIT, with 15W miniature iron, 3 nickel-plated bits having tip diameters of 2·3, 4 and 4·7 mm, supply of solder and heat sink in fitted plastics case. For 220/240V supplies ... ... Each **£2·47** *m*

REPLACEMENT AND ACCESSORY FOR TT-420 and TT-430
TT-435 **Bits, nickel-plated,** 2·3, 4 and 4·7 mm tip diameters. Set of 3 **£0·60** *m*

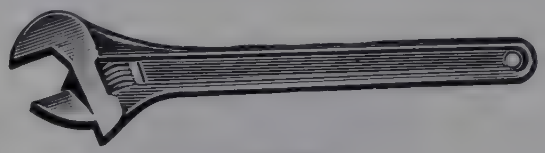
> **Gas blowpipe with soldering attachment**—see BR-240 and BR-250 in List No. sequence.

TT-440

TT-440
SOLDERING IRON, 65W, with round pencil bit. For 230/250V supplies. Overall length 35 cm. Each **£2·35** *m*

TT-450
SOLDER, 'Multicore,' Ersin cored, non-corrosive, for electrical use, 60/40 tin/lead 18 swg. In carton. Each **£0·25** *m*

EB-220
ELECTRICAL TERMINATIONS SET. For details and price see entry in List No. sequence.

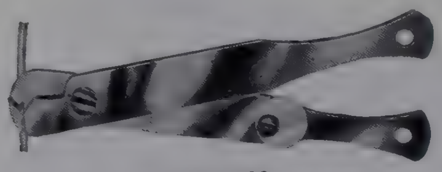


TT-500

***TT-500**
SPANNER, adjustable, 15° angled head. Length 150 cm, jaw maximum opening 20 mm... Each **£1·00** *m*

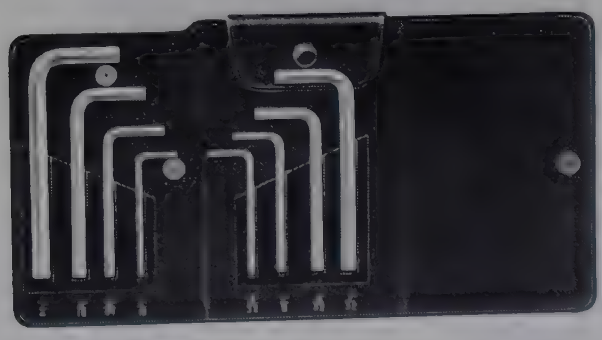
TT-510
SPANNERS, B.A., tempered pressed steel, set of six, range 0 to 11 B.A. ... ... Set **£0·40** *m*

TT-550
VICE, bench, plain screw type, with interchangeable hardened steel jaw plates; jaw width 8·5 cm, opening 10 cm ... ... Each **£3·95** *m*



TT-560

TT-560
WIRE CUTTER STRIPPER, preset to avoid damage to conductor when stripping insulation ... Each **£0·27** *m*



TT-575

TT-575
WRENCHES, hexagon socket screw, set of eight in plastics case, 1/16 to 1/4 in A/F ... ... Set **£0·45** *m*

TT-577
WRENCHES, hexagon socket screw, set of seven in plastics case, 1·5 to 8 mm A/F ... ... Set **£0·55** *m*

All items on this page normally available from stock.

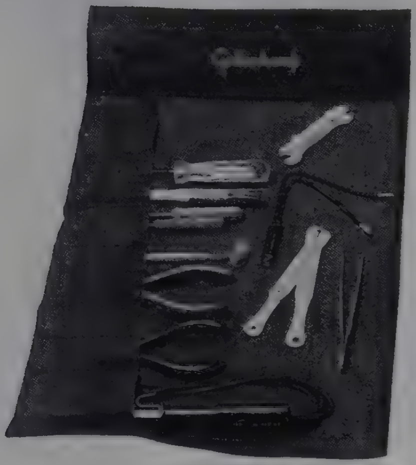
TOOL KITS

TT-590

TT-590

TOOL KIT, chemists and analysts. A personal set of instruments useful for all actively concerned in chemical analysis. Comprises one each of the following in a plastics wallet.

Brush, dusting
Caliper, boxwood, 10 cm
File, triangular, 15 cm
Forceps, nickel plated steel, 12·5 cm
Magnifier, acrylic, ×2
Pencil, All-Stabilo, black
Platinum wire in glass rod
Scalpel, stainless steel blade
Scissors, nickel plated steel, 15 cm
Spatula, stainless steel, offset spoon, 19 cm
Spatula, stainless steel, Chataway, 15 cm
Spatula, stainless steel, micro Chataway, 15 cm
Spatula, polythene, 12·5 cm
Syringe, plastics, 1 ml with needle ... Each **£4·50** *c*

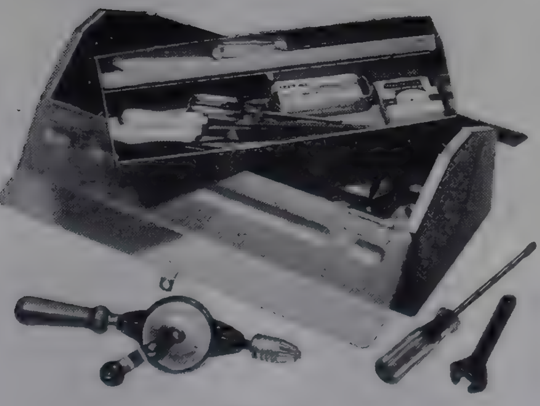


TT-600

TT-600

TOOL KIT, instrument and electronic, comprising one each of the following tools in a plastics roll.

BU-615	Brush, dusting, 12·5 mm
DR-032	Forceps, stainless steel, 12·5 cm
EB-180	Test prod with neon indicator lamp
TT-200	Mirror, dental type
TT-254	Pliers, snipe nose
TT-256	Pliers, side cutting, 12·5 cm
TT-340	Screwdriver, 1 each sizes 7·5, 10 and 15 cm
TT-350	Screwdriver, Phillips, 7·5 cm
TT-420	Soldering iron, 15W 220/240V
TT-510	Spanners, BA, set of six
TT-560	Wire stripper ... ... Each **£7·25** *m*



TT-610

TT-610

TOOL KIT, laboratory workshop, in strong metal case with carrying handle and provision for padlocking. Small tools can be placed in a removable tray. Tool kit TT-600 can be carried inside. Comprises one each of the following tools:—

TT-080	Drill brace
TT-082	Set of drills
TT-110	File, round
TT-112	File, 3-square
TT-130	Hacksaw
TT-131	Dozen blades
TT-150	Hammer
TT-160	Trimming knife
TT-250	Pliers, combination
TT-280	Centre punch
SB-620	Scissors, 18 cm
TT-340	Screwdriver, 20 cm
TT-344	Screwdriver, 15 cm
TT-350	Screwdriver, Phillips, 10 cm
TT-390	Snips
TT-440	Soldering iron, 65W supplied for 230/250V unless otherwise specified
TT-500	Spanner, adjustable
RX-055	Rule, 10 in
RX-060	Measure, 2 metres
TT-575	Set of hexagonal wrenches, $\frac{1}{16}$ to $\frac{1}{4}$ in A/F
TT-577	Set of hexagon wrenches, 1·5 to 8 mm A/F

Each **£20·00** *m*

Other useful 'Tools' will be found under the following page headings:

BLOWPIPES
BRUSHES
DISSECTING
ELECTRICAL
GAUGES
GLASSBLOWING
LIGHTERS
MAGNIFIERS
MEASURES
PENCILS
PLASTICS
PRESSES
RULES
SPATULAS
TACHOMETERS
TUBING

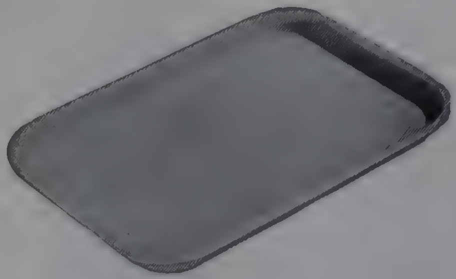
All items on this page normally available from stock.

TRAYS

TU-515

TRAYS, high impact polystyrene, white, 2·5 cm deep.

Size	30×15	43×33 cm
Each	**£0·30**	**0·80**

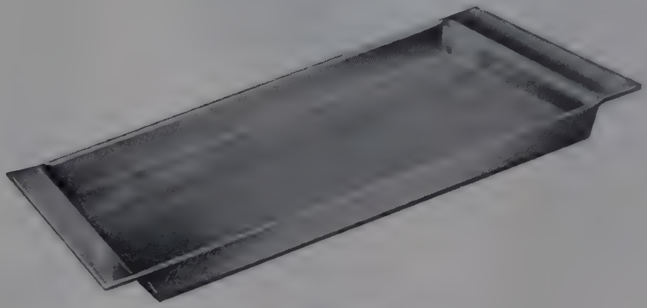


TU-515

TU-520

TRAYS, rigid PVC, with end handles. Easily cleaned and corrosion resistant. Will withstand 105°C.

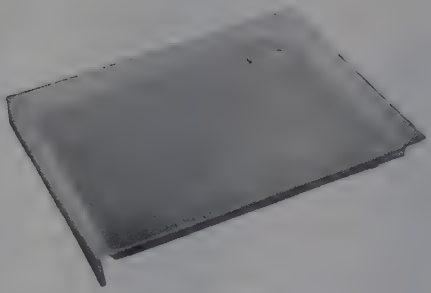
Size	42×22×2·2	57×41×1·6 cm	
Each	**£2·40**	**4·10**	*m*



TU-520

TU-532

TRAY, mercury, rigid PVC, with drain hole and plug. Dimensions 41×32×2 cm ... Each **£3·10** *m*



TU-532

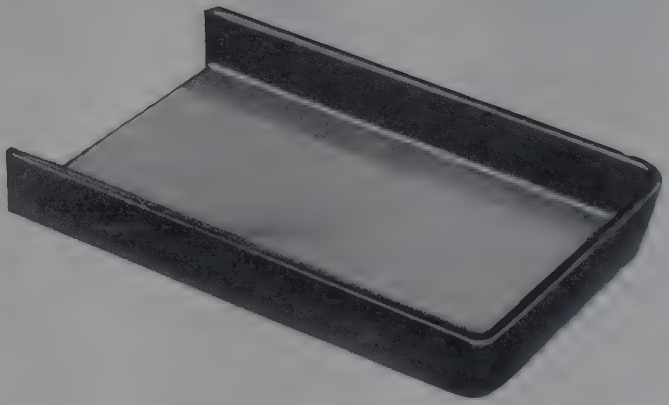
TU-540

TRAYS, translucent silica, suitable for *Gallenkamp* muffle furnaces, with rim on three sides.

Dimensions	67×114	118×175	152×248 mm	
For muffle	12·5×15	15×23·5	17×38 cm	
Ten	**£13·20**	**24·85**	**47·25**	*m*
Each	**£ 1·50**	**2·80**	**5·30**	

BT-640 TRAYS, bottle
DM-240, DM-250 TRAYS, developing
DM-260, DM-265 TRAYS, dissecting

For details see entries in List No. sequence.



TU-540

TRIANGLES

TV-540

TRIANGLES, iron wire, covered with pipe clay tubes.

Side of triangle	39	50	63	76 mm	
100	**£4·60**	**4·60**	**5·40**	**6·20**	c
10	**£0·52**	**0·52**	**0·60**	**0·70**	
Each	**£0·13**	**0·13**	**0·13**	**0·14**	

TV-560

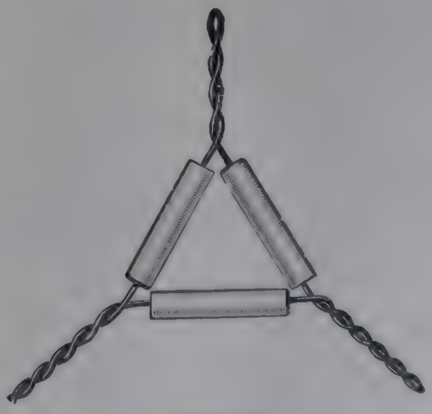
TRIANGLES, nickel-chromium wire, covered with *Vitreosil* silica tubes.

Side of triangle	39	50	63	76 mm	
Ten	**£2·10**	**2·10**	**2·80**	**3·55**	*m*
Each	**£0·30**	**0·30**	**0·36**	**0·43**	

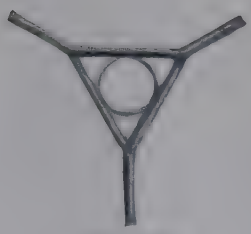
TV-570

TRIANGLES, *Vitreosil* translucent silica, components fused together.

Side of triangle	50	63 mm	
Ten	**£8·20**	**9·45**	*m*
Each	**£0·89**	**1·06**	



TV-540
TV-560



TV-570

All items on this page normally available from stock.

FS-212
FS-215

Gallenkamp

TUBE FURNACES

FS-212 **1000°C max.**, single tube 3·8 cm bore.

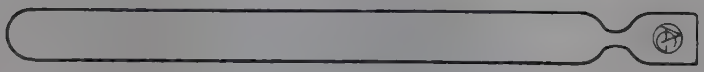
FS-215 **1200°C max.**, single tube 3·8 cm bore.

FS-300 **1400°C max.**, single tube 3 cm bore.

FS-400 **1500°C max.**, single tube, choice of 3·9 cm and 8 cm bores.

For full details and prices see entries in List No. sequence.

COMBUSTION TUBES



TW-430

TW-430

TUBES, Carius, soda-lime glass, for sealed tube reactions. With heavy wall capable of withstanding necessary pressures at temperatures up to 300°C. Wall thickness 2 to 2·5 mm, overall length 60 cm, closed at one end and constricted at the other end.

External diameter	14 to 16	24 to 26 mm	
Ten	**£4·20**	**8·00**	*a*
Each	**£0·48**	**0·90**	

TW-480

TUBES, combustion glass, suitable for temperatures up to 700°C. Wall thickness 1·5 mm; length 30 cm, open both ends.

Internal diameter	16	19	25 mm	
Ten	**£2·50**	**3·15**	**9·60**	*m*
Each	**£0·32**	**0·38**	**1·08**	

MK-400
TUBES, micro-combustion.
MK-410
TUBES, micro Carius.

For details and prices see entries in List No. sequence.

TW-484

TUBES, combustion, transparent silica for use up to 1000°C. Length 450 mm.

Internal diameter	15	19 mm	
Wall thickness approx.	1·2	1·2 mm	
Ten	**£9·00**	**13·00**	c
Each	**£1·00**	**1·45**	

TW-488

TUBE, combustion, transparent silica, length 127 cm × 15 mm internal diameter.

Ten **£15·50** Each **£1·75** c

GR-160

QUARTZ WOOL, for filling combustion tubes. For details and price see entry in List No. sequence.

FURNACE WORK TUBES

FS-860

TUBES, FURNACE WORK, translucent fused silica, for use up to 1050°C.

FS-865

TUBES, FURNACE WORK, impervious aluminous porcelain, for use up to 1500°C.

FS-870

TUBES, FURNACE WORK, porous fused alumina, for use up to 1700°C.

FS-875

TUBES, FURNACE WORK, impervious fused mullite, for use up to 1700°C.

For full details and prices of above tubes see entries in List No. sequence.

CROSS REFERENCE TO TUBES IN OTHER SECTIONS OF THE CATALOGUE

Absorption	see	AB-600 et seq.	Haematocrit	see	MC-705, MD-020 and MD-022
Blood sedimentation	see	MD-670	Manometer	see	MB-020 to MB-062
Centrifuge	see	CJ-005 et seq.	Melting point	see	MF-386 and MF-388
Drying	see	AB-600 et seq.	Test tubes	see	TF-100 to TF-422
Filter	see	FD-530 et seq.			

All items on this page normally available from stock.

SPECIMEN TUBES

TW-600

TUBES, specimen, straight sided, clear glass, with polythene push-in closures.

Length	50	50	50	50 mm	
Diameter	10	12	19	25 mm	
Pack qty.	335	220	210	125	
10 packs	**£18·00**	**13·00**	**21·00**	**17·50**	c
Pack	**£ 2·00**	**1·45**	**2·35**	**1·95**	

Length	75	75	75 mm	
Diameter	12	19	25 mm	
Pack qty.	220	210	125	
10 packs	**£16·00**	**25·50**	**20·50**	c
Pack	**£ 1·80**	**2·85**	**2·30**	

TW-605

TUBES, specimen, straight sided clear glass with bark corks.

Length	50	50	50	75	75	100 mm	
Diameter	10	12	25	19	25	25 mm	
Pack qty.	144	144	72	144	72	72	
10 packs	**£9·00**	**9·60**	**13·20**	**16·00**	**14·40**	**16·00**	c
Pack	**£1·00**	**1·08**	**1·50**	**1·80**	**1·60**	**1·80**	

TW-610

POSTAL BOX, wood, for specimen tubes TW-600 or TW-605. Each box accepts one 75×25 mm tube. In pack of 10 ... ... 10 packs **£9·00** Pack **£1·00** c

TW-630

TUBES, specimen, straight sided, clear glass, with polythene snap-on closures. Also suitable for use as weighing tubes.

Capacity	5	10	20	30 ml	
Length	25	40	60	70 mm	
Diameter	23	24	25	28 mm	
Pack qty.	140	130	110	95	
10 packs	**£19·00**	**19·00**	**21·00**	**22·00**	c
Pack	**£ 2·15**	**2·15**	**2·35**	**2·45**	

TW-650

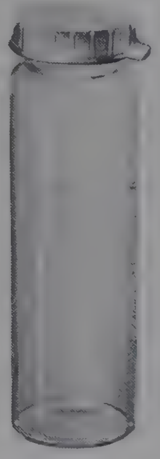
TUBES, specimen, polythene, with fitted hinged lids. Also suitable for use as small weighing tubes. In packs of 25.

Length	60	75 mm	
Diameter	16	24 mm	
10 packs	**£3·30**	**6·20**	c
Pack	**£0·39**	**0·70**	

TW-600

TW-605

TW-610



TW-630

TW-650

TW-660 with TW-664

TW-660

TUBES, specimen, polypropylene, for the storage or transit of tablets, powders, pastes and small components. Each container comprises a full aperture tube on which the polythene cap once fitted is securely held until the tear-tab is pulled and the lower part peeled off. In position the security cap provides a high resistance to loss of gas and vapour from the tube. When the tear-strip is removed the upper half of the cap becomes a snap on sealed lid ideal as a temporary closure. The combination of tube with tear-strip cap is particularly suitable for postal transit and storage of samples where a tamperproof container is required. **Without caps.**

Capacity	22	50	135	328 ml	
Height	41	52	75	113 mm	
Cap dia.	26	35	49	62 mm	
Pack qty.	150	100	40	25	
10 packs	**£12·60**	**10·60**	**10·80**	**12·20**	c
Pack	**£ 1·40**	**1·18**	**1·20**	**1·35**	

ACCESSORIES

TW-664 **Caps,** polythene.

Diameter	26	35	49	62 mm	
Pack quantity	180	120	90	60	
10 packs	**£4·60**	**4·60**	**6·20**	**6·00**	c
Pack	**£0·51**	**0·51**	**0·70**	**0·66**	

All items on this page normally available from stock.

SODA-LIME GLASS TUBING

MEDIUM WALL

TX-250

TUBING, soda-lime glass, medium wall, for general bending and glassblowing work in laboratories. Free from lead and will not devitrify in a blowpipe flame. In lengths of approx. 150 cm. The figures in pack qty. column indicate the average number of 150 cm lengths in a pack of approx. 10 kg.

Ext. dia. mm		Wall mm	Pack qty. approx.	Pack	10 lengths	Per length	
				£	**£**	**£**	
3·5	±0·5	0·5±0·1	594	**9·60**	**0·25**	**0·13**	c
4·5		0·6±0·1	336	**9·00**	**0·35**	**0·13**	c
5·5			248	**6·60**	**0·34**	**0·13**	c
6·5			174	**3·80**	**0·29**	**0·13**	c
7·5		0·9±0·1	142	**3·80**	**0·33**	**0·13**	c
8·5			128	**3·80**	**0·36**	**0·13**	c
9·5			110	**3·80**	**0·41**	**0·13**	c
10·5			100	**3·80**	**0·44**	**0·13**	c
11·5			94	**3·80**	**0·46**	**0·13**	c
12·5			86	**3·80**	**0·50**	**0·13**	c
13·5			78	**3·80**	**0·54**	**0·13**	c
14·5			70	**3·80**	**0·60**	**0·13**	c
15·5			64	**3·80**	**0·64**	**0·14**	c
17	±1		60	**3·80**	**0·70**	**0·14**	c
19			54	**3·80**	**0·76**	**0·15**	c
21			48	**3·80**	**0·86**	**0·16**	c
23			42	**3·80**	**0·98**	**0·17**	c
25			36	**3·80**	**1·12**	**0·18**	c
27		1·1±0·1	30	**4·90**	—	**0·24**	c
29			26	**4·90**	—	**0·27**	c

EXTRA HEAVY WALL

TX-260

TUBING, soda-lime glass, as TX-250 but **extra heavy wall.**

Ext. dia. mm		Wall mm	Pack qty. approx.	Pack	10 lengths	Per length	
				£	**£**	**£**	
13	±1	2·25 ±0·25	36	**6·00**	**1·80**	**0·24**	c
15			32	**6·00**	**2·00**	**0·26**	c

CAPILLARY BORE

TX-265

TUBING, soda-lime glass, as TX-250 but **capillary bore,** suitable for demonstration barometers, thermometers and Sprengel pumps, etc.

Ext. dia. mm		Wall mm		Pack qty. approx.	Pack	10 lengths	Per length	
					£	**£**	**£**	
5·5	±0·5	0·5	±0·25	118	**18·00**	**1·70**	**0·24**	c
6·5		1		88	**12·40**	**1·60**	**0·22**	c
7·5		2		72	**9·80**	**1·50**	**0·22**	c
9·5		3		50	**9·80**	**2·10**	**0·27**	c

NOTE: All glass tubing prices apply to tubing in standard lengths. Tubing may be cut to shorter lengths at extra cost depending on size, finish required, wastage and length tolerance. Quotations on receipt of details.

EXPORT OF TUBING

Unless we are instructed to the contrary orders for less than the pack quantity may be supplied with the tubing cut into nominal 75 cm lengths to avoid excessive packing and freight charges.

GENERAL PROPERTIES OF BOROSILICATE AND SODA-LIME GLASSES

Borosilicate glass has good resistance to thermal shock and can be worked in a blowpipe flame using gas together with compressed air enriched with oxygen. After working it should be annealed in a furnace at 565 to 570°C for 15 minutes then allowed to cool slowly and uniformly no faster than 200°/hour to below 150°C.

Soda-lime glass can be worked in a Bunsen or gas/air burner flame without devitrification. It should be annealed; the technique of cooling in a luminous flame until carbon is deposited is adequate but furnace annealing at 515 to 520°C followed by slow cooling is preferable.

Both types of glasses have excellent chemical resistance, borosilicate being slightly less alkali resistant but more acid resistant than soda-lime glass.

TECHNICAL DATA

TYPICAL CHEMICAL ANALYSIS

Component	Composition	
	Borosilicate	Soda-lime
Silica	80·6%	71%
Boric oxide	12·6%	—
Sodium oxide	4·15%	15%
Aluminium oxide	2·2%	2·2%
Calcium oxide	0·1%	5·7%
Magnesium oxide	0·05%	2·9%
Barium oxide	5 ppm	1·7%
Potassium oxide	—	1·2%

PHYSICAL PROPERTIES

Property	Borosilicate	Soda-lime
Expansion coefficient	$3{\cdot}3\times10^{-6}$ per degC	$9{\cdot}2\times10^{-6}$ per degC
Specific gravity	2·23 gm/cm³	2·50 gm/cm³
Refractive index (n_D)	1·475	1·513
Strain point	520°C	475°C
Annealing point	565°C	515°C
Softening point	820°C	710°C

All items on this page normally available from stock.

BOROSILICATE GLASS TUBING

LIGHT WALL

TX-280

TUBING, *Pyrex brand,* **borosilicate glass, light wall.** In standard lengths of 150 cm approx. The figures in std. pack qty column indicate the number of 150 cm lengths in a standard pack.

Ext. diam. mm		Wall mm	Std. pack qty	Std. pack	10 lengths	Per length
				£	£	£
4	±0·4	0·8±0·1	360	15·25	0·51	0·13
5			260	13·80	0·62	0·13
6		1±0·1	240	12·05	0·59	0·13
7			200	12·05	0·70	0·14
8			180	12·85	0·84	0·16
9			150	12·05	0·92	0·16
10			132	9·45	0·82	0·16
11			120	9·30	0·88	0·16
12			108	9·35	0·96	0·17
13			100	9·30	1·04	0·17
14			76	9·35	1·40	0·20
15		1·2±0·2	68	9·15	1·45	0·21
16			64	9·25	1·55	0·22
17			60	9·30	1·70	0·23
18			56	9·25	1·85	0·25
19			52	9·10	1·90	0·25
20	±0·5		52	10·45	2·20	0·28
22			44	9·80	—	0·30
24			40	10·35	—	0·34
26		1·4±0·2	40	10·55	—	0·34
28			32	9·20	—	0·36
30	±0·8		32	12·30	—	0·46
32			20	8·40	—	0·48
34			20	8·75	—	0·50
36			20	9·20	—	0·53
38			20	9·95	—	0·57
40	±1·0	1·6±0·2	15	7·65	—	0·58
42			15	9·95	—	0·74
44			15	10·65	—	0·80
46			15	11·10	—	0·84
48			15	11·45	—	0·86
50		1·8±0·2	15	13·25	—	1·00
52			4	3·75	—	1·00
54			4	3·75	—	1·00
56			4	3·75	—	1·00
58			4	5·40	—	1·45
60	±1·5	2·2±0·3	4	5·40	—	1·45
65			4	5·85	—	1·55
70			4	6·20	—	1·65
75			4	7·05	—	1·90
80	±1·8	2·5±0·3	4	7·50	—	2·00

For technical data on borosilicate and soda-lime glasses see facing page.

MEDIUM WALL

TX-285

TUBING, *Pyrex brand* **borosilicate glass,** as TX-280 but **medium wall.** In lengths of 150 cm approx.

Ext. diam. mm		Wall mm	Std. pack qty.	Std. pack	10 lengths	Per length
				£	£	£
6	±0·4	1·5±0·2	150	10·35	0·78	0·15
7			140	15·40	1·35	0·20
8			115	14·90	1·50	0·21
9			100	14·90	1·65	0·23
10			90	8·95	1·10	0·18
11			75	8·30	1·25	0·19
12			70	8·65	1·35	0·20
13			65	8·65	1·45	0·21
14			55	8·00	1·60	0·22
15		1·8±0·2	45	8·00	—	0·26
16			45	8·00	—	0·26
17			40	8·30	—	0·28
18			36	8·00	—	0·30
19			36	8·45	—	0·31
20	±0·5		32	8·70	—	0·35
22			32	9·70	—	0·38
24			28	9·35	—	0·40
26		2·0±0·2	20	8·30	—	0·48

EXPORT OF TUBING

Unless we are instructed to the contrary orders for less than the pack quantity may be supplied with the tubing cut into nominal 75 cm lengths to avoid excessive packing and frieght charges.

CAPILLARY BORE

TX-290

TUBING, *Pyrex brand* **glass,** as TX-280 but **capillary** bore. In lengths of 150 cm approx.

Ext. dia. mm		Int. dia. mm		Std. pack qty.	Std. pack	10 lengths	Per length
					£	£	£
5	±0·8	0·5	±0·25	120	10·65	1·00	0·17
6		0·75		85	11·35	1·50	0·22
7		1·0		65	11·35	1·95	0·26
7		1·6	±0·4	65	11·35	1·95	0·26
7		2·5		65	10·50	1·80	0·24
8		2·0		50	11·35	2·45	0·31
9		3·0		40	10·65	2·85	0·35

GLASS TUBING ACCESSORIES

FV-244	**Storage stand**
GJ-150	**Tubing gauge**
GP-175 **to** **GP-190**	**Cutting tools**
GP-300	**Safety grip**

For full details and prices see entries in List No. sequence.

All glass tubing prices apply to tubing in standard lengths. Tubing may be cut to shorter lengths at extra cost depending on size, finish required, wastage and length tolerance. Quotation on receipt of details.

All items on this page normally available from stock (code *d*).

FLEXIBLE TUBINGS

PROPERTIES OF ELASTOMERIC MATERIALS

Until recent years the only material with a high degree of elasticity at normal ambient temperatures available for laboratory purposes was natural rubber.

Lately, resulting from the development of 'synthetic rubbers' and plastics materials the range of **elastomers** available for such items as laboratory tubing and stoppers has been increased substantially. The properties of the more common materials are listed below. In catalogue entries where the unqualified term **Rubber** is used, it may be assumed that the item is made of natural rubber.

To facilitate the recognition of elastomeric materials used for the manufacture of *Gallenkamp* **stoppers and tubings,** these items are **colour coded** as follows.

Butyl rubber	Black
Natural rubber (latex)	Translucent amber
Natural rubber (filled)	Red
Neoprene	Grey
PVC	Transparent colourless
Silicone	Translucent-opalescent

Exceptions to this code are TX-625, canvas reinforced natural rubber pressure tubing and TX-770, PVC tubing for gas analysis purposes.

GENERAL PROPERTIES OF COMMON ELASTOMERS

Type of elastomer	Appearance and notable features	Maximum service temperature °C approx.	Sterilization		Attacking reagents	
			Air at 160°C	Steam at 121°C	Acids and alkalis	Common organic solvents
Butyl rubber (isobutylene-isoprene)	Filled and pigmented. Very low gas permeability	110	No	No	None	Esters, chlorinated hydrocarbons
Natural rubber (natural polyisoprene)	Translucent (latex) or filled and pigmented	70	No	Some grades	Conc. oxidising acids	Aliphatic, aromatic and chlorinated hydrocarbons, esters, ketones and ethers
Neoprene (polychloroprene)	Filled and pigmented	120	No	No	Conc. oxidising acids	Aromatic and chlorinated hydrocarbons, esters and ketones
Nitrile rubber (styrene acrylonitrile)	Filled and pigmented	130	No	Yes	Conc. oxidising acids	Chlorinated hydrocarbons, esters and ketones
PVC (plasticised vinyl)	Transparent or pigmented. Low gas permeability	50	No	Some grades	None	Ketones, cyclic ethers, esters and chlorinated hydrocarbons
Silicone rubber	Translucent. Very flexible	250	Yes	Yes	Strong alkalis	Esters

NOTE: This table is of a general nature; the properties of certain individual formulations may differ from those quoted.

RECOMMENDED TUBINGS FOR SPECIAL PURPOSES

COMPRESSED AIR	TX-625, TX-778
GAS ANALYSERS	TX-500, TX-770
GASES	
Fuel gas, coal	TX-520, TX-635, TX-750, TX-780
Fuel gas, LPG	TX-500
Fuel gas, natural (methane)	TX-500
Inert gases (from cylinders fitted with pressure regulators)	TX-625, TX-778
PERISTALTIC PUMPS	TX-805
VACUUM	
Low, filter pumps, etc.	TX-525, TX-772, TX-774
High, oil filled pumps	TX-755, TX-778
WATER	
At mains pressures	TX-625, TX-778
At low pressures	TX-525, TX-755, TX-772, TX-774

BRITISH STANDARD 2775

BS 2775 was prepared in order to specify the important physical properties and to rationalise the sizes of laboratory stoppers and elastomeric tubings. Two ranges of wall thicknesses of tubings are tabulated which will be found adequate for most applications, normal wall (N) and heavy wall (H). Wherever possible the tubings listed conform to the requirements of this Standard.

Normal wall range

Designation	N3	N5	N6·5	N8	N10
Int. dia.	3	5	6·5	8	10 mm
Wall	0·75	1·5	1·5	2	2 mm
Designation	N12·5	N16	N20	N25	
Int. dia.	12·5	16	20	25	
Wall	2·25	3·25	3·25	3·25 mm	

Heavy wall range

Designation	H3	H5	H6·5	H8	H10	H12·5
Int. dia.	3	5	6·5	8	10	12·5 mm
Wall	3	4	5	6	7	8·5 mm

FLEXIBLE TUBINGS

(continued)

BUTYL RUBBER

TX-500

TUBING, butyl rubber, black. A very low gas permeability tubing particularly suitable for precision gas analyses where changes in gas composition due to diffusion through the tubing are to be minimal. Also suitable for use with natural gas (methane). To BS 2775. Coil of 20 metres.

Designations	—	N3	N5	N6·5	N8	
Int. dia.	1·5	3	5	6·5	8 mm	
Wall	0·5	0·75	1·5	1·5	2 mm	
Coil	£0·80	0·94	1·50	1·75	2·10	c
Metre	£0·13	0·13	0·15	0·16	0·18	

NATURAL RUBBER

TX-520

TUBING, natural rubber, red, **normal wall,** to BS 2775. Coil of 20 metres.

Designation	N3	N5	N6·5	N8	N10	
Int. dia.	3	5	6·5	8	10 mm	
Wall	0·75	1·5	1·5	2	2 mm	
Coil	£1·00	1·50	1·65	2·10	2·50	c
Metre	£0·13	0·15	0·16	0·18	0·20	

Designation	N12·5	N16	N20	N25	
Int. dia.	12·5	16	20	25 mm	
Wall	2·25	3·25	3·25	3·25 mm	
Coil	£3·30	5·80	8·00	9·60	c
Metre	£0·24	0·36	0·47	0·55	

TX-525

TUBING, natural rubber, red, **heavy wall,** to BS 2775. Coil of 20 metres.

Designation	H3	H5	H6·5	H8	H10	H12·5	
Int. dia.	3	5	6·5	8	10	12·5 mm	
Wall	3	4	5	6	7	8·5 mm	
Coil	£2·20	3·60	6·00	7·80	10·40	14·40	c
Metre	£0·18	0·25	0·37	0·46	0·60	0·82	

TX-600

TUBING, natural rubber, (latex) translucent amber, **normal wall,** extremely elastic with very smooth bore. Sulphur free, has good ageing properties and can be repeatedly sterilized at 121°C. To BS 2775. Coil of 20 metres.

Designation	N3	N5	N6·5	N8	N10	
Int. dia.	3	5	6·5	8	10 mm	
Wall	0·75	1·5	1·5	2	2 mm	
Coil	£3·20	4·40	5·40	8·60	9·00	c
Metre	£0·23	0·29	0·34	0·49	0·52	

TX-625

TUBING, natural rubber, thick wall, reinforced with canvas. To BS 924 Part 1, suitable for working pressures up to 150 lbf/in² (10·5 kgf/cm²). Coil of 18 metres.

Int. dia. nominal	6	10	13	16 mm	
Int. dia.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$ in	
Ext. dia.	$\frac{19}{32}$	$\frac{23}{32}$	$\frac{7}{8}$	$1\frac{1}{16}$ in	
No. of plies	3	3	4	5	
Coil	£9·00	10·60	12·60	16·00	c
Metre	£0·53	0·68	0·82	1·04	

TX-635

GAS BURNER TUBES, natural rubber, red, with reinforced ends for fitting to Bunsen burner and gas tap tubulures. External diameter 8·5 mm, length 60 cm.

Ten **£3·50** Each **£0·41** *c*

NEOPRENE

TX-750

TUBING, neoprene, grey, normal wall. Free from sulphur. To BS 2775. Coil of 20 metres.

Designation	N5	N6·5	N8	N10	N12·5	
Int. dia.	5	6·5	8	10	12·5 mm	
Wall	1·5	1·5	2	2	2·25 mm	
Coil	£1·80	2·20	3·00	3·70	4·90	c
Metre	£0·17	0·18	0·22	0·26	0·32	

TX-755

TUBING, neoprene, grey, heavy wall. Free from sulphur. To BS 2775.

Designation	H3	H5	H6·5	H8	H10	H12·5	
Int. dia.	3	5	6·5	8	10	12·5 mm	
Wall	3	4	5	6	7	8·5 mm	
Coil length	20	20	20	20	20	10 metres	
Coil	£3·10	5·30	7·80	10·80	15·00	11·60	c
Metre	£0·23	0·34	0·46	0·62	0·86	1·30	

PVC (VINYL)

TX-770

TUBING, PVC, opaque green. With smooth internal bore and low gas permeability making it especially suitable for use where contamination cannot be tolerated as in blood gas determinations, etc. Recommended for use with Van Slyke's apparatus. Internal diameter 6·35 mm, wall thickness 3·2 mm. Coil of 30 metres.

Coil **£6·80** Metre **£0·30** *m*

TX-772

TUBING, PVC, colourless, transparent, normal wall. Non-toxic and of great durability. Can be steam sterilized at 125°C. Suitable for medical and biological applications. To BS 2775.

Designation	N3	N5	N6·5	N8		
Int. dia.	3	5	6·5	8	mm	
Wall	0·75	1·5	1·5	2	mm	
Coil length	30	30	30	30	metres	
Coil	£0·70	2·00	2·20	3·90		c
Metre	£0·13	0·14	0·15	0·21		

Designation	N10	N12·5	N16		
Int. dia.	10	12·5	16	mm	
Wall	2	2·25	3·25	mm	
Coil length	30	10	10	metres	
Coil	£4·80	2·40	3·50		c
Metre	£0·23	0·30	0·41		

For properties of elastomers and recommendations of tubings for particular uses see page 764.

All items on this page normally available from stock.

FLEXIBLE TUBINGS

(continued)

PVC (VINYL)

continued

TX-774

TUBING, PVC, colourless, transparent. Slightly less elastic than TX-772.

Int. dia.	6	8	10	12	18	25 mm	
Wall	1	1·5	2	2	2·5	3 mm	
Coil length	30	30	30	10	10	10 metres	
Coil	£0·76	1·45	2·40	0·94	1·75	2·80	c
Metre	£0·13	0·13	0·16	0·16	0·24	0·34	

TX-778

TUBING, PVC, colourless, transparent with terylene mesh reinforced wall. A flexible tubing of great inherent strength. Suitable for high pressure or vacuum applications.

Int. dia.	5	6·5	8	10 mm	
Wall	2·5	3	3	3·5 mm	
Coil length	30	30	30	30 metres	
Coil	£5·40	7·60	8·20	10·80	c
Metre	£0·26	0·33	0·35	0·43	

Int. dia.	13	16	20 mm	
Wall	3·5	4	4 mm	
Coil length	10	10	10 metres	
Coil	£4·30	6·20	7·60	c
Metre	£0·48	0·68	0·84	

TX-780

TUBING, PVC with wall reinforced with steel wire spiral. This tubing is very flexible, is crush resistant and will not kink, thus reducing hazards. Suitable for large gas burners and larger pieces of gas operated equipment. Approx. 7 mm bore. Requires end connectors TX-782. Coil of 10 metres ... Coil **£2·35** Metre **£0·30** c

ACCESSORY

TX-782 **End connectors,** neoprene, fluted internally one end for gas tight connection to tubing TX-780.
Ten pairs **£1·65** Pair **£0·23** c

SILICONE RUBBER

TX-805

TUBING, silicone rubber, translucent, non-toxic, extremely elastic. Suitable for use in peristaltic pumps. Will withstand storage in tropical conditions and repeated sterilisation in steam at 121°C or air at 160°C. Wall thickness 1·6 mm. Coil of 10 metres.

Int. dia. nominal	0·6	1	1·5	2 mm	
Coil	£1·85	2·10	2·50	3·20	c
Metre	£0·25	0·27	0·32	0·38	
Int. dia. nominal	3	4	6	8 mm	
Coil	£3·60	4·20	5·50	7·20	c
Metre	£0·42	0·47	0·62	0·80	

OTHER PLASTICS TUBINGS

TX-825

TUBING, acrylic, transparent, seamless. In lengths of 6 ft (180 cm).

Ext. dia.	¼	½	1	2 in	
Int. dia.	5/32	⅜	¾	1¾ in	
Per length	£0·45	0·65	1·15	2·95	*m*

AE-200

ADHESIVE suitable for above tubing. For details and price see entry in List No. sequence.

TX-835

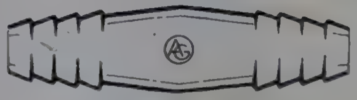
TUBING, polythene, natural grade, medium wall. A tough flexible but inelastic tubing. In coil of 30 metres.

Int. dia.	1·5	3·0	4·5	6·3	8·0	12·5 mm	
Wall	1·5	1·5	1·5	1·5	1·5	2·0 mm	
Coil	£0·45	0·80	0·96	1·20	1·35	3·00	c
Metre	£0·13	0·13	0·13	0·13	0·13	0·17	

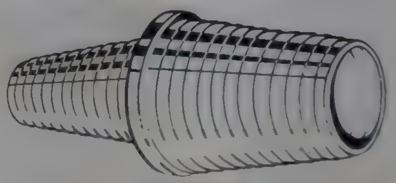
PP-780

WELDING TORCH, for welding polythene, PVC or other thermoplastics. The torch operates on bottled butane or propane gas and the combustion gases serve as the heat vehicle for welding. For full details and price see entry in List No. sequence.

TUBING CONNECTORS



TX-850



TX-854

TX-850

TUBING CONNECTOR, (AG), glass, for joining two pieces of flexible tubing. Comprises a length of glass tubing with tapered corrugations at each end to accept 5 to 12 mm bore tubings. Overall length 6·5 cm.
Ten **£1·70** Each **£0·24** *a*

TX-854

TUBING CONNECTORS, nylon, with corrugated conical ends to accept flexible tubing.

Minimum outside diameter		Minimum inside dia. mm	Length mm	Ten	Each	
Large end mm	Small end mm					
				£	£	
7	4	3	53	1·10	0·18	*m*
9	4	3	62	1·20	0·19	*m*
10	7	5	62	1·40	0·21	*m*
13	10	8	66	1·70	0·24	*m*
19	13	11	75	2·40	0·30	*m*

All items on this page normally available from stock.

TUBING CONNECTORS
(continued)

TX-858

TUBING CONNECTORS, push-fit, polythene, for joining flexible tubing. One piece of tubing is fitted to each half of the connector and the two halves can then easily be joined or separated.

Int. dia. of tubing	7 to 9	10 to 16 mm	
Ten	£1·60	2·40	c
Each	£0·23	0·31	

TX-860

T-TUBES, glass.

Limb length	40	50	70 mm	
Ext. dia.	5	7	10 mm	
Ten	£0·66	0·70	0·90	a
Each	£0·14	0·14	0·16	

TX-865

T-TUBES, TPX, corrugated for connecting flexible tubing.

Length	27	36	40 mm	
For tubing bores	5 to 7	7·5 to 8	10 to 12·5 mm	
Ten	£0·74	0·80	1·20	m
Each	£0·15	0·15	0·19	

TX-870

T-TUBES, glass, with two stopcocks.

Limb length	60	70 mm	
Ext. dia.	5	7 mm	
Ten	£11·00	13·00	a
Each	£ 1·25	1·45	

TX-875

T-TUBE, Ⓐ, **glass** with corrugated nipple ends to accept tubing from 5-12 mm bore.
Ten **£2·90** Each **£0·35** *a*

TX-880

Y-TUBES, glass.

Limb length	40	50	70 mm	
Ext. dia.	5	7	10 mm	
Ten	£0·84	0·90	1·20	a
Each	£0·16	0·16	0·19	

TUBING AND HOSE CLIPS see CP-220 to CP-285 in List No. sequence.

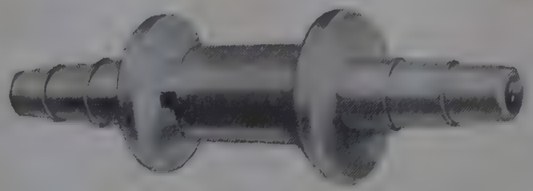
TUBING EXPANDER

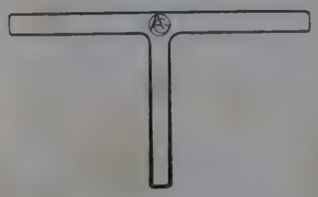
This useful tool provides a ready means of expanding the ends of rubber or plastics tubing and fitting them on to glass tubing or nipple connectors without any risk of damage to the glassware. The three jaws of the pliers are fitted with bent needles, the ends of which are inserted into the tubing. On squeezing the handles, the three needles move apart concentrically and the tubing is stretched. It can then be placed over the glass connection and the tool withdrawn.

TX-910

TUBING EXPANDER, large size for tubing of minimum 4 mm bore, maximum opening 22 mm.
Each **£3·30** *m*

TX-911 **Needles,** set of 3 for replacement ... Set **£0·80** *m*


TX-858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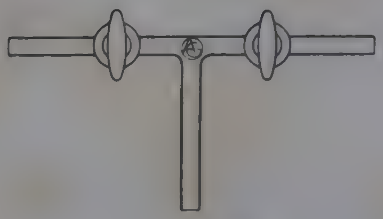
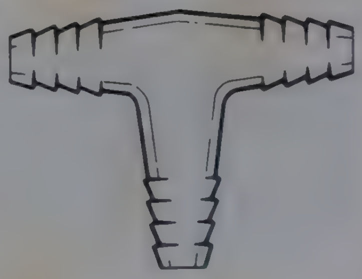
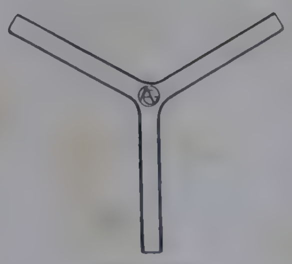

TX-870

TX-865


TX-875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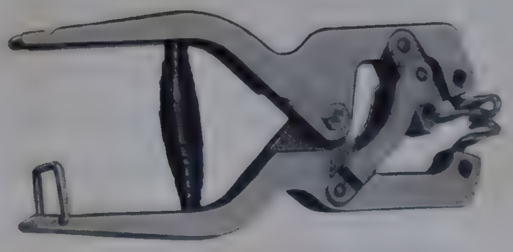

TX-910

All items on this page normally available from stock.

ULTRASONIC CLEANING

- **Stainless steel bath 45 cm deep for total immersion of most pipettes**
- **Cleans in a fraction of the time required by other methods**
- **Harmless to most intricate mechanisms or delicate apparatus**
- **Requires no skill in operation**
- **Built-in heater and thermostat, temperature range ambient to 95°C**
- **Fitted draincock for emptying**

UL-150

CLEANING MATERIALS AND WASHING EQUIPMENT

Other items for cleaning and washing are listed elsewhere in this catalogue as below:

Cloths	see CM-510 to CM-560
Chamois leather	see CM-590
Sponges	see CM-620
Tissues	see CM-650 to CM-662
Polishes	see CM-760 to CM-775
Bottle washers	see WD-020 and WD-050
Pipette washers	see WD-120

For efficient, high speed cleaning of instruments, components and laboratory glassware including pipettes, burettes, flasks, separating funnels and other items which are difficult to clean by traditional methods.

Principle of Ultrasonic Cleaning

Electrical energy generated at high frequency is fed to a transducer in which it is converted into mechanical vibrations. The transducer is fitted to the base of the cleaning bath which is partially filled with liquid, and the vibrations produce a phenomenon known as cavitation which is the continual formation and disappearance of minute cavities throughout the liquid. The local forces produced at each cavity are very large and result in a rapid cleaning action on the surfaces of objects immersed in the liquid.

Description

The ultrasonic cleaner comprises a generator and a cleaning bath. The generator is a solid state power oscillator which is air cooled by an integral fan. Power from the generator is led to the bath by means of a cable and socket.

The bath has a stainless steel liner and is fitted with an immersion heater and hydraulic thermostat. A cock on the side enables the contents of the bath to be drained.

Cleaning Solutions

For general purposes a solution made from cleaning powder UL-156 provides powerful cleansing without foaming. The powder, which incorporates a rinse aid, is packed in single charge quantities each of which makes 15 litres of solution.

Where the removal of a specific contaminant is required for which the cleaning powder solution is inadequate the tank should be filled with a suitable solvent. In each case the ultrasonic cleaner accelerates particle detachment and effects cleaning in the minimum of time.

Technical Data

Bath

Internal dimensions	25×16×45 cm deep
Overall dimensions	39×33×60 cm high
Capacity, approx.	15 litres
Heater power rating	1 kW
Thermostat range	ambient to 95°C
Weight, net	19 kg

Generator

Power rating, approx.	375W
Output frequency	25 ±3 kHz
Modulating frequency	100 Hz
Output power, mean	200W
Overall dimensions	44×17×25 cm high

UL-150

ULTRASONIC CLEANER, as specification, with generator and 15 litre stainless steel lined cleaning bath fitted with 1 kW heater, thermostat and drain cock.

For 220/240V 50/60 Hz single phase supplies. Each **£350·00** *g*

For 110/120V 50/60 Hz single phase supplies. Each **£375·00** *gN*

ACCESSORIES

UL-154	**Lid,** stainless steel		Each	**£4·00**	*f*
UL-156	**Cleaning powder.** In pack sufficient to make 15 litres of solution ... ... 20 packs	**£8·80**	Pack	**£0·50**	c
CM-742	**Cleanser,** *By-Prox*, a liquid detergent equally effective in hard, soft and salt water	For details and prices see entries in List No, sequence.			
CM-751	**Cleanser,** *Decon 75*, a general purpose surfactant				

Items on this page normally available from stock except those coded *N*.

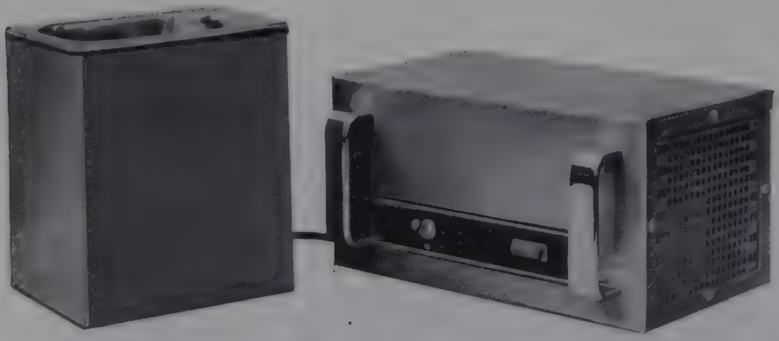
ULTRASONIC CLEANING

The general purpose ultrasonic kits listed below are suitable for cleaning delicate mechanisms, electrical components, small pieces of glass apparatus and medical instruments, etc.

Each kit comprises a generator and a stainless steel bath. The generator develops power at frequencies above the audible limit, pulsed at mains frequency, and the signal is transmitted to a transducer bonded to the base of the bath.

The generator requires no warm-up time and tunes automatically to take account of liquid level, cleaning load and input voltage.

The bath is suitable for liquid temperatures up to approximately 150°C. However some hot solutions can damage the bath and the manufacturer's instructions must be followed with regard to the use of hot cleaning solutions.


UL-170

UL-170

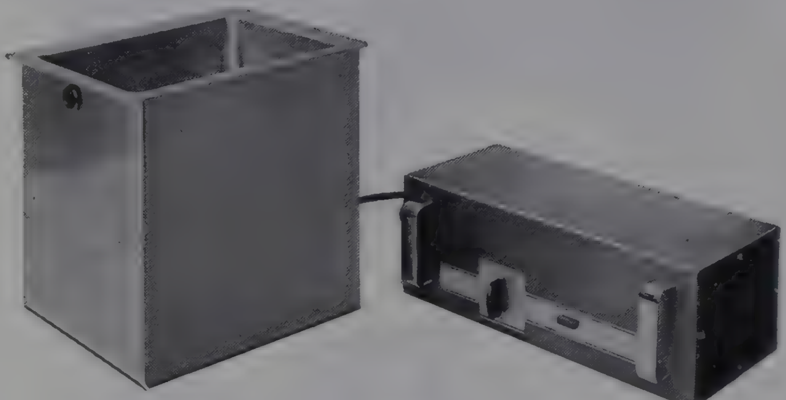
ULTRASONIC CLEANING KIT, comprising a 2 litre capacity cleaning bath, 100W mean output 40 kHz generator, coaxial connector and instructions manual.

Bath dimensions, internal	15·5×11×12·5 cm deep
Bath dimensions, external	19·5×14×21 cm high
Generator dimensions	30·5×18×16 cm high

For 220/240V 50/60 Hz single phase supplies. Each **£96·00** *fS*

For 110/120V 50/60 Hz single phase supplies. Each **£111·00** *f*

ACCESSORY
UL-172 **Lid,** stainless steel ... ... Each **£2·00** *fS*


UL-180

UL-180

ULTRASONIC CLEANING KIT, comprising 5 litre capacity cleaning bath, 200W mean output 40kHz generator coaxial connector and instructions manual.

Bath dimensions, internal	25 ×16×15 cm deep
Bath dimensions, external	28 ×19×25 cm high
Generator dimensions	30·5×18×16 cm high

For 220/240V 50/60 Hz single phase supplies. Each **£165·00** *f*

For 110/120V 50/60 Hz single phase supplies. Each **£180·00** *f*

ACCESSORY
UL-154 **Lid,** stainless steel. For price see entry in List No. sequence.

Suitable cleaning solutions
—general purpose use CM-742
—special purpose use CM-751
For details see entries in List No. sequence.

Ultrasonic emulsifier see MU-950 in List No. sequence.

VACUUM APPARATUS

SECTION INDEX

Rotary Pumps

List No.	Model	Page
VB-042	ISP30C	770
VB-090	ED 30	770
VB-104	ES 50	770
VB-114	ED 50	770
VB-126	ES 100	770
VB-136	ED 100	770
VB-146	ES 200	770
VB-156	ED 200	770
Diffusion pumps		774
Gauges		775 to 777
Greases		775

	Page
Vacuum trolley, *Gallenkamp*	773
Vacuum vessels	778

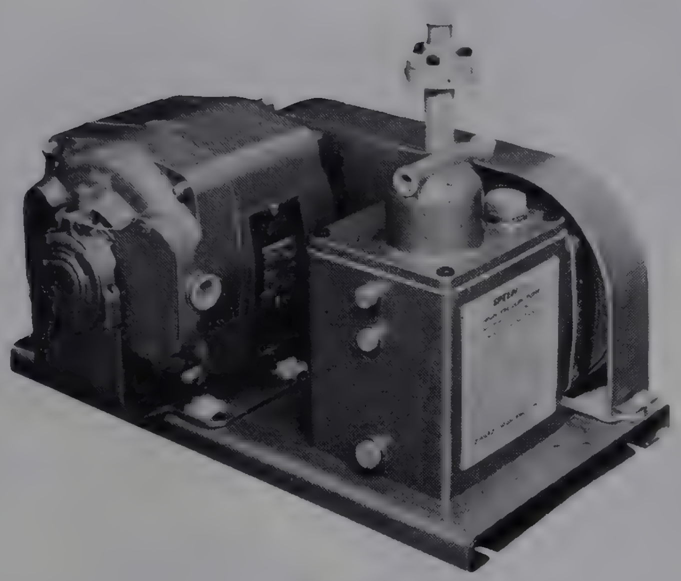
Other pumps offering vacuum facilities

AF-410 and AF-414	Air pumps
AF-430 to AF-535	Combined compressor/vacuum pumps
FD-210 to FD-250	Filter pumps
FV-984	Vacuum pump, large capacity

For details and prices see entries in List No. sequence.

Items on this page coded *S* normally available from stock.

ROTARY PUMPS



VB-042

VB-090

The pumps are designed for trouble-free operation and are constructed from light alloy diecastings. An outfit comprises a pump and a motor mounted on a base.
Features include:

OIL CONTROL VALVE

All pumps are fitted with a patented valve to prevent oil flooding the pipeline system, and making additional non-return valves unnecessary.

GAS BALLAST

Enables systems, containing water vapour or other condensable vapours, to be pumped without contaminating the pump oil. This feature prevents the progressive deterioration of the pump performance or the limitation of application to completely clean systems.
Not provided on VB-042.

VACUUM TIGHT CASING

Effective sealing makes the pump ideal for gas recirculation and recovery work.

INLET FILTER

Inlet filter cleans and silences ballast air under all conditions.

BAFFLE SYSTEM

An effective control prevents oil spray discharge. For complete elimination of oil mist, special accessories are available.

VACUUM CONNECTION

All pumps are fitted with a flange clamping muff coupling enabling metal or glass pipeline connections to be made instantly. The couplings supplied normally have fittings for BS 659 tubing.
Adapters are available for connecting to flexible vacuum tubing or standard conical joint all glass systems.

TWO STAGE PUMPS

An oil recirculation device permits only degassed oil to enter the high vacuum stage, and high vacua can be obtained even on full gas ballast.

PRESSURE DUTY

VB-104 can be used as a compressor, giving up to 1·05 kgf/cm². An adjustable pressure relief valve is fitted.

> The unit TORR is being used in this catalogue to comply with the recommendation in BS 2951 'Glossary of terms used in high vacuum technology'. Please note that 760 torr = 1 standard atmosphere, therefore for all practical purposes 1 torr = 1 mm Hg. abs.

PUMP DATA

List No.	Model No.	No. of stages	Ultimate vacuum, torr		Approx. water vapour pumping rate g/hour	Displacement l/min	Oil charge litres	Motor hp	Nominal bore of connector, mm
			Without gas ballast	With gas ballast					
VB-042	ISP 30C	1	0·1	Not fitted	Nil	30	1	¼	12
VB-090	ED 30	2	0·0005	0·02	40	30	1	¼	20
VB-104	ES 50	1	0·01	0·5	70	53	0·45	¼	12
VB-114	ED 50	2	0·0005	0·01	100	53	0·75	¼	12
VB-126	ES 100	1	0·005	0·5	90	100	1·2	⅓	25
VB-136	ED 100	2	0·0002	0·005	150	100	2·0	⅓	25
VB-146	ES 200	1	0·005	0·3	190	190	1·7	½	25
VB-156	ED 200	2	0·0001	0·001	170	190	1·85	½	25

ROTARY PUMPS

VB-042

VACUUM PUMP, *Edwards* **ISP 30C,** construction and performance as specified, with motor for 220/240V 50 Hz single phase supplies, initial charge of oil and instructions ... ... Each **£51·00** *f*

REPLACEMENT PARTS

VB-047	**Vee-belt**	Each	**£0·50**	*f*
LX-140	**Pump oil.** For price see entry in List No. sequence.			

ACCESSORIES

VB-061	**Anti-vibration mountings**	Set	**£3·70**	*f*
VB-066	**Non-return valve**	Each	**£6·30**	*f*
VB-068	**Moisture trap,** with desiccant tray, for direct mounting on pump	Each	**£14·70**	*f*
VB-070	**Adapter,** metal, with 19/26 cone ...	Each	**£1·25**	*f*
Q-MF13/2	**Adapter,** with 19/26 socket to fit VB-070 and straight nozzle suitable for 8 mm bore flexible tubing. For price see entry on page 626.			

VB-090

VACUUM PUMP, *Edwards* **ED 30,** construction and performance as specified, with direct-drive motor for 220/240V 50 Hz single phase supplies, initial charge of oil and instructions ... ... Each **£70·00** *fN*

VB-104

VACUUM PUMP, *Edwards* **ES 50,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£65·00** *f*

VB-114

VACUUM PUMP, *Edwards* **ED 50,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£94·00** *f*

REPLACEMENT PART

VB-116	**Vee-belt,** for VB-104 and VB-114 ...	Each	**£0·75**	*f*

ACCESSORIES

VB-118	**Adapter,** metal, to connect 6·5 or 8 mm rubber vacuum tubing to VB-104 or VB-114	Each	**£1·00**	*b*
VB-119	**Cone,** borosilicate glass, 19/26, to connect an all-glass system to VB-104 or VB-114	Each	**£0·70**	*a*
VB-121	**Anti-vibration mountings,** for VB-104.	Set	**£3·70**	*f*
VB-122	**Anti-vibration mountings,** for VB-114	Set	**£3·70**	*f*
VB-068	**Moisture trap,** with desiccant tray. For price see entry in List No. sequence.			
VB-123	**Adapter,** connecting VB-104 or VB-114 to trap VB-068.	Each	**£3·30**	*f*

VB-126

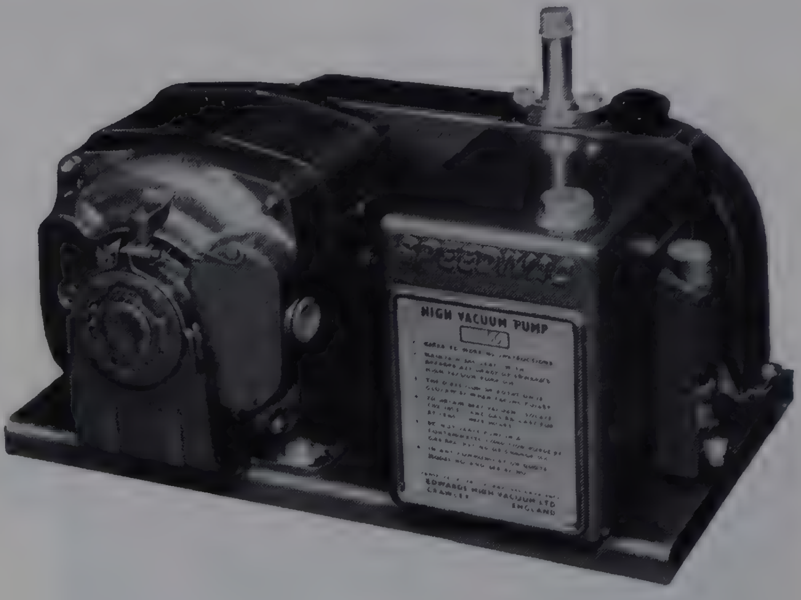
VACUUM PUMP, *Edwards* **ES 100,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£91·00** *f*

VB-136

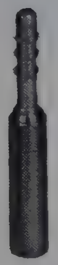
VACUUM PUMP, *Edwards* **ED 100,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£125·00** *f*

VB-146

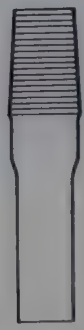
VACUUM PUMP, *Edwards* **ES 200,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£124·00** *f*



VB-114



VB-118



VB-119

FLEXIBLE TUBING suitable for vacuum applications see TX-755 and TX-778 in List No. sequence.

VB-156

VACUUM PUMP, *Edwards* **ED 200,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions.
Each **£168·00** *fN*

LX-140	**Pump oil,** for all pumps VB-104 to VB-156. For price see entry in List No. sequence.			

ACCESSORY

VB-159	**Anti-vibration mountings,** for outfits VB-126 to VB-156	Set	**£3·70**	*fN*

When ordering please specify for which pump.

VB-175

OIL MIST FILTER, *Edwards* **OMF200,** for use with vacuum pumps, up to 200 l/min displacement. Reduces the air pollution by separating and trapping oil mist from the discharge of any oil sealed rotary pump, and is particularly valuable where the outlet has to be indoors, such as with trolley mounted pumps ... Each **£18·00** *fN*

Items on this page normally available from stock except those coded *N*.

Gallenkamp VACUUM OVENS, 150°C

For accelerated batch drying or for preventing decomposition of heat sensitive materials without loss of drying speed. With uses in chemical, biological, pharmaceutical and other fields.

Gallenkamp
VACUUM OVEN

OV-930

- **Temperature control within 0·5degC**
- **Two sizes available**
- **All controls built-in**
- **Glass fibre reinforced plastics case**
- **Safe, reliable operation**
- **Vacuum range 0 to 760 torr**

For full details and prices see OV-930 in List No. sequence.

Gallenkamp METAL FILTER PUMPS

FD-210

FD-215 with FD-216

FD-210

FILTER PUMP, *Gallenkamp*, of plated metal. With a water supply at 1·75 kgf/cm² (25 lbf/in²) the pump requires only 6 litres of water in approx. 100 sec to evacuate a 1 litre system to an ultimate vacuum of about 15 torr.

FD-215

FILTER PUMP, *Gallenkamp*, **high efficiency, chromium plated.** Using a water supply at 1·75 kgf/cm² (25 lbf/in²) pressure, the pump requires only 3·5 litres of water to evacuate a 1 litre system to 15 torr, and such evacuation, owing to the high throughput rate, takes only 35 seconds. An ultimate vacuum of 12 to 15 torr is obtainable.

For full details and prices of above see entries in List No. sequence.

FILTER PUMP, electrically operated. Vacuum 150 torr. Pressure 1·4 kgf/cm²—see FD-250 in List No. sequence.

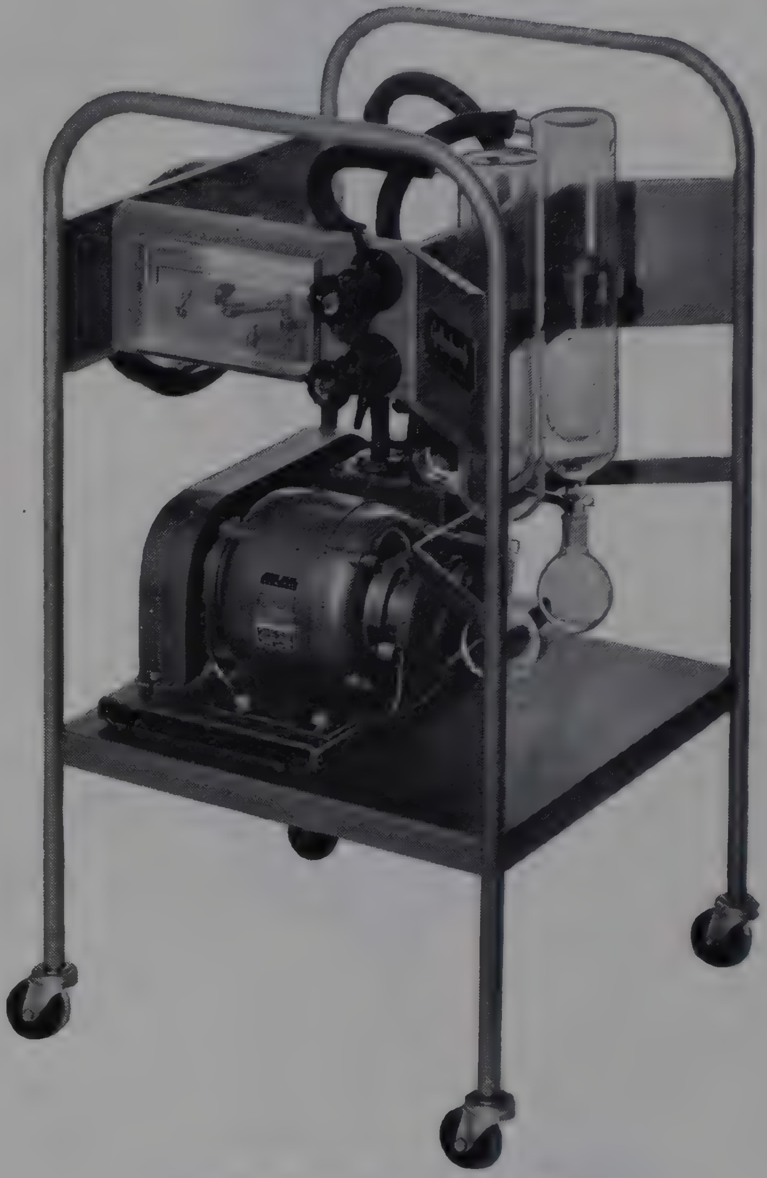
Gallenkamp VACUUM TROLLEY

A robust, efficient and convenient mobile vacuum source for chemical and other laboratories where it is necessary for the vacuum pump to be protected against intake of moisture and chemical vapours. The stove enamelled trolley is of strong tubular frame construction on free running castors with a shelf 56 × 43 cm for the pump. Fitted to the trolley are two vapour traps, a Vacustat calibrated to 10^{-2} torr and a manifold with two control valves.

The trolley can be used for vacua down to about 5×10^{-2} torr depending upon the size and type of vacuum pump used.

Each vapour trap is a borosilicate glass Dewar vessel with a drain tube at the bottom connected to a 100 ml receiving flask by a standard 19/26 ground joint. This novel and simple design ensures both adequate thermal insulation of the freezing mixture and a large condensing surface for contaminating vapours. In use, the trap is filled with alcohol or acetone to which a few lumps of solid carbon dioxide are added, and afterwards it is only necessary to detach the receiving flask and empty out the condensate.

An all-metal manifold with heavy wall rubber tubing connections to the vapour traps ensures safe and leak free connections between the components. The two diaphragm valves control the pumping rate, isolate the source where necessary, and control air intake into the system. A glass trap is optionally available for fitting to the vacuum pump inlet. It has a capacity of 1000 ml, and is recommended for use with pumps having no non-return valves in order to prevent accidental transfer of oil from the pump to the system should the pump be switched off without first breaking the vacuum.


VB-480 with vacuum pump

VB-480

VACUUM TROLLEY, *Gallenkamp*, as specification, supplied with *Vacustat*, vapour traps and diaphragm valves.
Without vacuum pump ... ... Each **£72·00** *b*

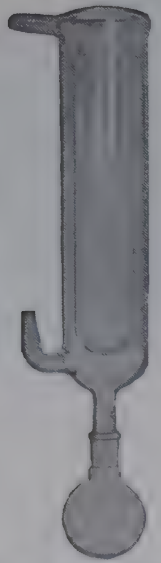
This trolley is suitable for use with VACUUM PUMPS such as VB-042, 104 and 114.

ACCESSORIES

VB-484	**Oil trap,** borosilicate glass, with 16 mm plain tubing connector for pump inlet	Each	**£2·60**	*a*
Q-MF13/2 **VB-070**	**Adapter set,** to connect pump VB-042 to trolley manifold ...	For details and prices see entries in List No. sequence.		
VB-118	**Adapter,** to connect pumps VB-104 and VB-114 to trolley manifold ...			
TX-755	**Tubing,** neoprene, heavy wall ...			
TX-778	**Tubing,** PVC, reinforced wall ...			
MF-932	**Mercury,** for Vacustat, approx. 250 g required			

REPLACEMENT PARTS

VB-486	**Vapour trap,** borosilicate glass, Dewar type with standard 19/26 ground cone, without flask VB-488.	Each	**£6·45**	*a*
VB-488	**Flask,** spherical with standard 19/26 ground socket, for use with VB-486	Each	**£1·05**	*a*


VB-486 with VB-488

All items on this page normally available from stock.

VAPOUR DIFFUSION PUMP

VB-500

To attain pressures lower than those given by the two-stage mechanical pump, a vapour pump is essential. In addition, the vapour pump gives high pumping rates and flow rates, at pressures near the ultimate of the mechanical pump. Where time is an important factor, it may be profitable to use a vapour pump to speed operations although the ultimate pressure required is within the capacity of a mechanical pump.

TECHNICAL DATA

Ultimate vacuum	10^{-7} torr
Speed, unbaffled	10 litres/sec
baffled	5–6 litres/sec
Backing pressure	4 torr
Heater loading	350W
Cooling water flow	0·5 litres/min minimum at 15°C

VB-500

VAPOUR DIFFUSION PUMP, mercury, *Edwards* **EMI,** as specification. For 100/130 or 200/250V supplies. Requires but does not include 30 ml (410 g) of mercury. Each **£47·50** *f*

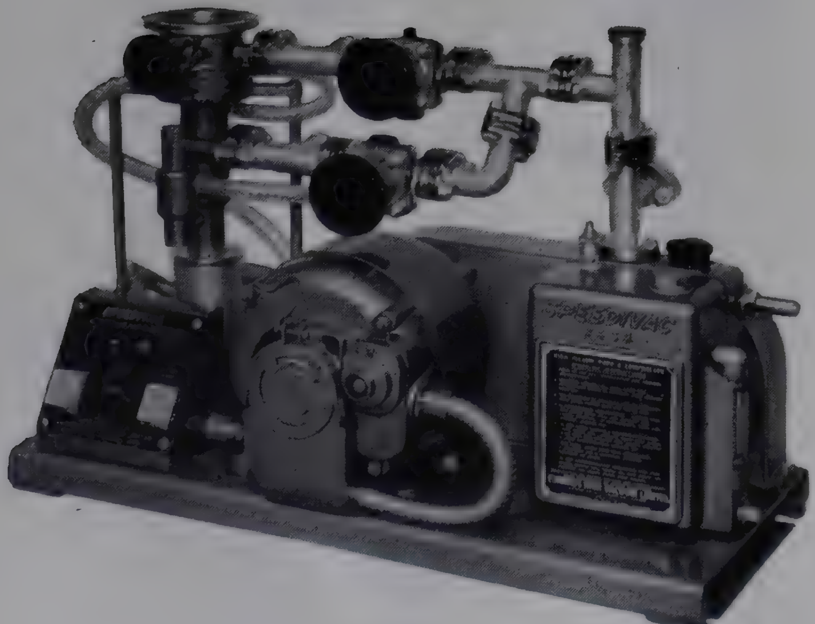
When ordering please state voltage to the nearest 10V.

ACCESSORIES

VB-583	**Baffle and isolation valve,** water cooled, for fitting directly to VB-500	Each **£28·00** *f*
MF-932	**Mercury,** triple distilled	For full details and prices see entries in List No. sequence
VB-104	**Backing pump** ...	

COMBINATION VAPOUR DIFFUSION AND ROTARY PUMP

A gas ballasted rotary pump is connected to a stainless steel water cooled oil diffusion pump giving a combined pumping speed of 6 litres/sec and an ultimate vacuum of 10^{-5} torr. A minimum cooling water flow of 300 ml/min at 15°C is necessary. Manually operated backing, roughing and air admittance valves, a thermal overload switch and on/off switches for the pumps are provided. A baffle valve, which enables the operator to isolate the pump and admit air to the system without switching off the pumps, is mounted on the diffusion pump and terminates in a 29/32 cone for connection to the apparatus to be evacuated. Provision is made for fitting a Pirani gauge head VC-094.



VB-680

VB-680

COMBINATION PUMP, *Edwards,* **10^{-5} torr,** as specification, comprising rotary and diffusion pumps and baffle valve mounted on a baseplate, and an initial supply of oil for both pumps. For 220/240V 50 Hz single phase supplies ... ... Each **£198·00** *f*

ACCESSORY

VC-094 **Gauge head.** For details see entry in List No. sequence.

OTHER VACUUM APPARATUS

Desiccators	see	DK-465 et seq.
Drying apparatus	see	DK-720 et seq.
Embedding baths	see	HJ-230 et seq.
Evaporator	see	EV-100
Manometers	see	MB-050 et seq.
Ovens	see	MV-600 and OV-930
Taps	see	FV-741 et seq.
Stopcocks	see	ST-780 et seq.
Tubing	see	TX-755 and TX-778

VACUUM VALVES AND CONTROLS

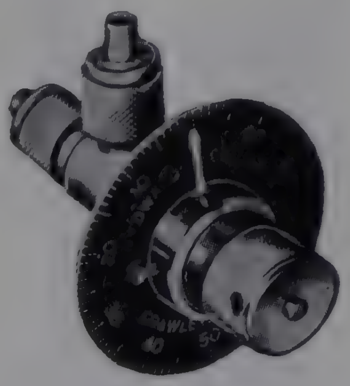
For low vacuum work, glass stopcocks and metal taps are available listed under STOPCOCKS and FURNITURE respectively.

VACUUM NEEDLE VALVES

Needle valves provide fine control of, for example, a gas bleed into a vacuum chamber.

VB-770

NEEDLE VALVE, vacuum sealed, *Edwards* **OSID,** with adjustable dial pointer and 0–100 scale. Chromium plated brass construction, with two $\frac{1}{16}$ in unions at right angles ... ... Each **£8·00** *f*



VB-770

10
15
5
SPEEDIVAC
20
0
torr
(m.m. Hg.)

VB-942

APIEZON VACUUM GREASES AND WAXES

Organic materials, highly refined for the most exacting vacuum requirements.

VB-880

APIEZON GREASE L, for sealing ground glass vacuum joints and for similar applications. The vapour pressure does not exceed 10^{-3} torr at 300°C. In 2 oz (56 g) tube. Each **£2·75** *f*

VB-882

APIEZON GREASE M, for similar applications to VB-880 but with a vapour pressure not exceeding 10^{-3} torr at 200°C. In 4 oz (112 g) tube ... Each **£2·00** *f*

VB-884

APIEZON GREASE N, a rubber grease for lubricating and sealing conical glass taps in vacuum apparatus. Unsuitable for use above 35°C; vapour pressure 10^{-3} torr. In 1 oz (28 g) tube ... ... Each **£2·50** *f*

VB-886

APIEZON WAX W, for sealing joints in vacuum systems, with a softening point of 60°C and a vapour pressure of 10^{-6} torr at room temperature. Stick form in 1 lb (450 g) packet ... ... Each **£1·50** *f*

Silicone grease see LX-235 in List No. sequence.

GJ-330

VACUUM GAUGE, Bourdon tube. For details see entry in List No. sequence.

Apiezon general purpose stopcock grease—see LX-225 in Addenda.

DIAL GAUGES

These gauges employ an evacuated metal capsule as the pressure sensitive element which is unaffected by barometric changes. Accuracy is $2\frac{1}{2}\%$ of full scale deflection.

The 10 cm diameter dial is housed in a metal case.

List No.	Range, torr	Each	
		£	
VB-942	0—20	21·50	*fN*
VB-950	0—100	21·50	*fN*
VB-955	0—760	21·50	*fN*

Items on this page normally available from stock except those coded *N.*

Vacustat VACUUM GAUGES

These readily portable bench gauges are similar in principle to the McLeod gauge. The gauge is simple to use; the backing plate with attached head scale and reservoir being rotated through 90° to take a reading.

VB-960, VB-962

VB-960

VACUUM GAUGE, *Vacustat,* **Model 1B2,** range 10 to 10^{-2} torr. With tripod stand, $\frac{1}{8}$ in Speedivac union for connection to the vacuum system and a protective Perspex cover. Height 230 mm ... Each **£14·50** *f*

VB-962

VACUUM GAUGE, *Vacustat,* **Model 2B2,** as VB-960, but range 1 to 10^{-3} torr ... ... Each **£15·50** *f*

MERCURY CHARGES

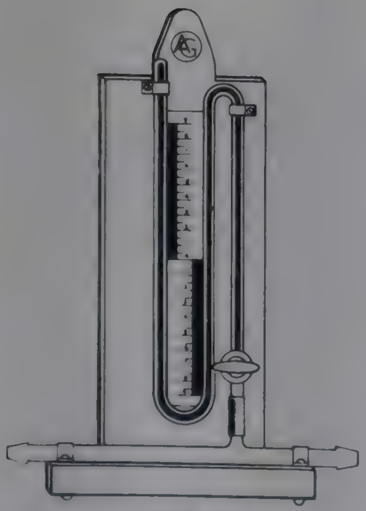
All *Vacustat* vacuum gauges require approximately 17 ml (250 g) of triple distilled mercury; the exact amount necessary is etched on the individual gauge heads.

Triple distilled mercury, see MF-932 in List No. sequence.

(AG) VACUUM MANOMETERS

MB-050

MANOMETER, Anschutz, (AG), with stopcock, on wooden stand with adjustable anodised aluminium scale, graduated 10–0–10 cm in mm. Supplied evacuated and filled with mercury to the stopcock, and therefore requires adjustment of the charge before use. For price see entry in List No. sequence.

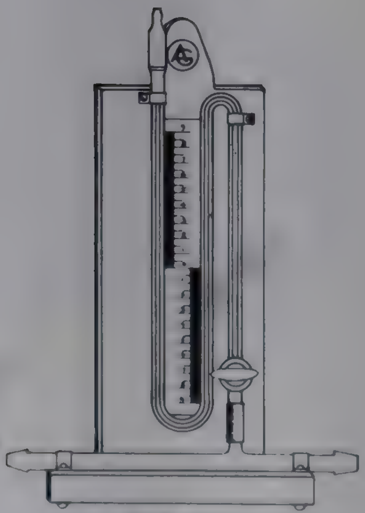


MB-050

MB-060

MANOMETER, Anschutz, (AG), borosilicate glass, as MB-050, with stopcock and **sintered glass seal** instead of closed end. Easily filled by adding a few ml of mercury to the funnel to produce a seal, and then by applying gentle suction to the funnel nozzle, mercury is introduced through the stopcock to fill the capillary. Air displaced from the capillary passes through the fritted plate. On wooden stand, with adjustable anodised aluminium scale graduated 10–0–10 cm in mm. **Without mercury.** For price see entry in List No. sequence.

For suitable mercury see MF-932 in List No. sequence.



MB-060

FLEXIBLE TUBING suitable for vacuum applications see TX-755 and TX-778 in List No. sequence.

All items on this page normally available from stock.

THERMAL (PIRANI) VACUUM GAUGES

These gauges operate by the change in temperature and hence in resistance of an electrically heated filament as the thermal conductivity of the surrounding gas changes with pressure. The resistance change is measured by a Wheatstone bridge circuit. Thus, a gauge can give a direct and continuous reading of the total gas and vapour pressure in a vacuum system.

PRESSURE RANGES

List No.	Model No.	Pressure range torr	Glass gauge head	Metal gauge head
VC-090	10	3 to 10^{-3}	VC-092	VC-094
VC-120	8-2	1 to 5×10^{-3} 5×10^{-3} to 1×10^{-4}	VC-124	

VC-090

VACUUM GAUGE, Pirani, *Edwards* **Model 10,** as specification, for bench or panel mounting. Dimensions 13·5×11×13 cm. Suitable for use with one gauge head only. For 200/250V 50/60 Hz single phase supplies. **Without gauge head** ... ... Each **£35·00** *f*

ACCESSORIES

VC-092 **Gauge head,** glass, *Edwards* G6B, for VC-090, with 14/23 cone connector and 14/23 borosilicate glass socket for connection to glass vacuum system. With 180 cm lead ... ... Each **£9·80** *f*

VC-094 **Gauge head,** metal enclosed, *Edwards* M6B, for VC-090, with connection to suit ½ in bore, 0·596 in (15 mm) outside diameter metal piping. With 180 cm lead. Each **£9·80** *f*

VC-120

VACUUM GAUGE, Pirani, *Edwards* **8-2,** dual scale, as specification. With transistor stabilised voltage supply for bench or panel mounting. Dimensions 22×17×19 cm. Two heads may be connected to one gauge; the current flowing continuously through the filaments of both and a selector switch being used to take readings from either. For 200/250V 50 Hz supplies. **Without gauge heads** ... ... Each **£69·00** *f*

ACCESSORY

VC-124 **Gauge head, glass,** *Edwards* G5-C2 with 14/23 cone connector and 14/23 borosilicate glass socket for connection to glass vacuum system. With 180 cm lead. Each **£25·50** *f*

VC-090

VC-120 with glass gauge head

VC-220

HIGH FREQUENCY TESTERS

When the probe of a high frequency tester is placed close to the wall of a glass vacuum system, a discharge is produced. With a knowledge of the gas in the system and from the appearance of the discharge, the pressure in the system can be deduced.

For leak detection, the probe is passed over the external surfaces of the system and any pinhole or crack will be located instantly by a thread like discharge running through it.

The probe unit is 25 cm long×56 mm diameter and is contained in a moulded plastics case. The probe of VC-240 is connected to a transformer unit which is fitted with a mains switch.

VC-220

HIGH FREQUENCY TESTER, *Edwards* **Model T1,** as specification, output 300 kHz. For 200/250V 50/60 Hz supplies. With 180 cm lead ... ... Each **£18·50** *f*

VC-240

HIGH FREQUENCY TESTER, *Edwards* **Model T2,** as specification, output 4-5 MHz. For 200/250V 50/60 Hz supplies. With 180 cm lead ... ... Each **£33·50** *f*

When ordering please state voltage and frequency of supply.

VACUUM VESSELS

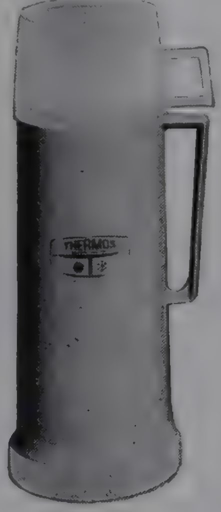
NOTE: Listed capacities and dimensions are approximate.

VC-505

VACUUM VESSELS, Dewar, cylindrical, silvered borosilicate glass.

Capacity	370	770	1150 ml	
Int. dia.	50	71	71 mm	
Int. depth	200	200	300 mm	
Each	**£2·35**	**2·90**	**3·00**	*m*

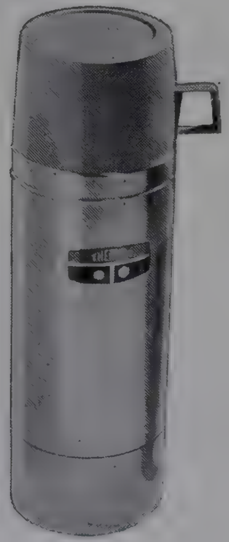
VC-505



VC-521

VC-530

VC-550


VC-570

VC-590

VC-521

VACUUM FLASKS, *Thermos,* cylindrical, silvered glass, in plastics container, with improved screw stopper and moulded cup.

Capacity	450	1000 ml	
Neck dia.	28	39 mm	
Int. depth	170	200 mm	
Each	**£0·53**	**0·87**	*m*

REPLACEMENT PARTS

VC-523	**Glass vessels.**			
	Capacity	450	1000 ml	
	Each	**£0·30**	**0·47**	*m*

VC-530

VACUUM FLASKS, *Thermos,* with silvered glass inner vessel. The wide mouth is closed by a stopper and covered by a moulded cap. For use with solids or liquids. With handle.

Capacity	1130	1700	4500 ml	
Neck dia.	86	109	86 mm	
Int. depth	170	185	260 mm	
Each	**£2·43**	**4·15**	**8·95**	*m*

REPLACEMENT PARTS

VC-532	**Glass vessels.**				
	Capacity	1130	1700	4500 ml	
	Each	**£1·33**	**2·30**	**3·90**	*m*

VC-550

VACUUM FLASK, *Thermos,* 4·5 litre, with silvered borosilicate glass inner vessel, neck diameter 140 mm, internal depth 280 mm, in a heavy gauge metal canister. With an insulated lid fastened by clamps and incorporating an air vent to facilitate removal. For use with solids or liquids. With handle ... ... Each **£12·90** *m*

REPLACEMENT PART

VC-552 **Glass vessel** ... ... Each **£3·90** *m*

***VC-570**

VACUUM FLASKS, *Thermos,* with **stainless steel** liner and outer container and polypropylene cap. Positive seal by screw-in stopper. Suitable for the storage of liquified gases.

Capacity	500	1000 ml	
Neck dia	30	30 mm	
Int. depth	140	200 mm	
Each	**£9·60**	**12·80**	*m*

VC-590

VACUUM VESSEL, for the storage of liquified nitrogen or oxygen. Comprises inner and outer aluminium spheres with the space between them insulated and evacuated for minimum heat transfer. The inner sphere is fitted with a rigid, low conductivity stainless steel neck tube.

Capacity	25 litres of liquified gas
Loss/24 hrs liquid nitrogen	3½% approx.
Working pressure, max.	1·75 kgf/cm²
Neck diameter	2·54 cm
Internal dimensions	38 cm dia. × 60 cm deep
Overall dimensions	46 cm dia. × 66 cm high
Weight, empty	7 kg
Weight, full	28 kg approx.

Each **£70·00** *mN*

Items on this page normally available from stock except those coded *N.*

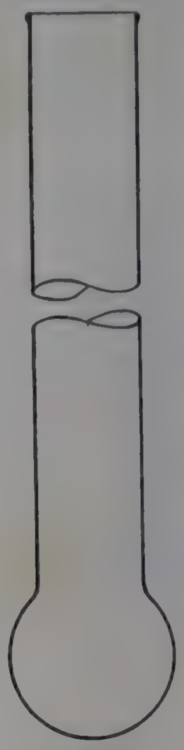
VAPOUR DENSITY APPARATUS

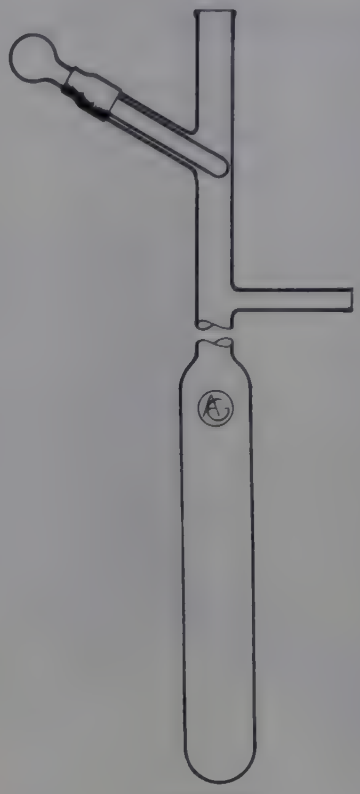
VM-015

VAPOUR DENSITY APPARATUS, Victor Meyer, comprising *Pyrex brand* glass jacket enclosing a borosilicate glass inner tube, overall length 81 cm, with a glass release rod fitted in the side tube. Supplied with ten 20 mm glass phials with ground-in stoppers ... Each **£3·65** *a*

REPLACEMENT PARTS

VM-020	**Jacket tube,** *Pyrex brand* glass.	Std. pack of 4	**£3·10**	Each	**£0·82**	
VM-025	**Inner tube**			Each	**£1·20**	*a*
VM-030	**Phial**	Ten	**£1·80**	Each	**£0·24**	*a*


VM-020


VM-025

VM-030

VICAT APPARATUS

VP-100

VICAT APPARATUS, for determination of consistency and initial and final setting times of cement. Weight of plunger together with consistency plunger or initial or final set needles adjusted to 300 g. Supplied with consistency plunger, initial and final set needles, mould and plate ... ... Each **£19·00** *c*

REPLACEMENT PARTS

VP-104	**Consistency plunger,** brass	Each	**£0·90**	c
VP-106	**Initial set needle,** hardened steel ...	Each	**£0·90**	c
VP-108	**Final set needle,** hardened steel ...	Each	**£0·90**	c
VP-110	**Split mould and baseplate,** brass and mild steel respectively	Each	**£4·20**	c

VP-100

VISCOMETRY

SECTION INDEX

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Master 785
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FLOW CUPS
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MISCELLANEOUS VISCOMETERS IN OTHER SECTIONS
Engler 594
EVT 593
I.C.I. Rotothinner 558
Redwood 595
Standard tar 594

All items on this page normally available from stock.

Gallenkamp UNIVERSAL TORSION VISCOMETER

FOR USE WITH LIQUIDS WITH NEWTONIAN OR ANOMALOUS VISCOSITY.

VISCOSITY RANGE 0·25 TO 10^3 POISES

AND TO 10^6 POISES WITH ACCESSORIES

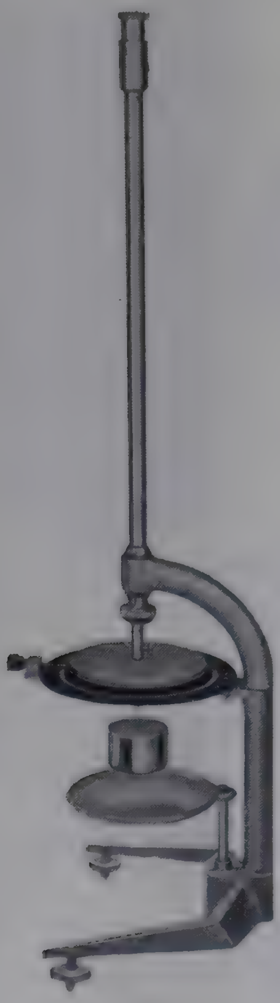
FEATURES

- Accurate results obtainable by unskilled operator
- Rapid determinations
- No thermostatically controlled bath required
- Results unaffected by suspended solids
- Wide range covered with different sizes of cylinders and wires

APPLICATIONS

- Dairy products testing
- Oil testing
- Paint testing
- Rubber latex testing

For many other materials including glues, gums, inks, chocolate, raw sugar, cosmetics and ceramic slips



VS-010

VS-034

VS-035

VS-036

DESCRIPTION

Essentially, the instrument comprises a metal cylinder suspended in the sample by a torsion wire. One end of the wire is attached to an adjustable head at the top of the instrument. At the lower end of the wire there is a flywheel disk with a pointer fixed on the edge, reading on a 360° circular scale. The zero point on the scale is fitted with a stop and a release pin which engages the flywheel pointer. The cylinder is supported from the lower side of the flywheel. A sample support table which swings to one side and has two fixed vertical positions is provided. The apparatus is mounted on levelling feet.

OPERATION

The viscosity of the sample is determined by the damping effect on the cylinder. The torsion cylinder is immersed about 1 cm below the surface of the sample which is contained in a cup or beaker. The flywheel disk is rotated through 360° and held by the release pin. When this pin is removed the flywheel and cylinder rotate back through the complete turn plus a part of an additional revolution. The amount of rotation beyond the zero point is noted on the scale and is a measure of the viscosity.

THIXOTROPY

If materials with thixotropic or other anomalous properties are to be tested the modified instrument VS-020 is recommended. This has an extra graduated scale at the top of the torsion wire so that torsion can be applied to the wire without disturbing the sample.

Each instrument is supplied with full working instructions for use both as a viscometer and as a thixotrometer. The instructions also contain a copy of the approximate calibration curves for the wire and cylinder combinations supplied with VS-010 and VS-020.

NOTE: Calibration curves are available for wires gauges 30 and 36 only.

VS-010

VISCOMETER, UNIVERSAL TORSION, *Gallenkamp*, as specification, with two interchangeable wires 30 and 36 SWG, and three cylinders $\frac{1}{4}$, $\frac{11}{16}$ and $1\frac{3}{8}$ in diameter ... ... Each **£31·00** *b*

VS-020

VISCOMETER, UNIVERSAL TORSION, *Gallenkamp*, as VS-010 but modified for use as a thixotrometer as well as a viscometer ... ... Each **£33·00** *b*

ACCESSORIES AND REPLACEMENTS

VS-030 **Cylinders, torsion.**

Diameter	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{11}{16}$	$1\frac{1}{8}$	$1\frac{3}{8}$ in	
Ten	£7·80	8·40	10·00	10·80	15·00	*b*
Each	£0·86	0·92	1·12	1·20	1·70	

VS-032 **Wires, torsion.**

Gauge	24	26	28	30	32	34	36 SWG

All, Ten £7·40 Each £0·82 *b*

VS-034	**Cup,** for containing liquid sample, comprising plated metal cup with thermometer pocket mounted on a flat disk which fits in the centring guides of the sample table. Internal diameter 67 mm, internal depth 60 mm.	Each	£2·70	*b*
VS-035	**Cup,** as VS-034, but water jacketed permitting temperature control by water circulation ...	Each	£10·50	*b*
VS-036	**Stirrer,** to fit cups VS-034 or VS-035 ...	Each	£2·20	*b*

EVT Viscometer	see	PH-620
ICI Rotothinner	see	PB-255

in List No. sequence.

All items on this page normally available from stock.

ROTATING CYLINDER VISCOMETERS

When immersed in the sample, an outer cylinder driven by a synchronous motor rotates the liquid and causes a viscous drag on a spring loaded coaxial inner cylinder. The resulting angular deflection of the latter, shown as a pointer reading, is proportional to the viscosity. As the measurement of angular deflection is displayed continuously, the way in which viscosity varies with time (and temperature) at fixed ratio of shear can be studied.

VS-110
VISCOMETER, rotating cylinder, *Ferranti* **Model VL,** with set of VL, VH and VM cylinders and 20 g cm torque spring. Viscosity range 0·168 to 97 poise; speed range 99·5 to 297·3 rev/min; shear rate 43 to 950 sec^{-1}. **For use at temperatures up to 30°C.** In leather case. For 200/250V 50 Hz single phase supplies ... Each **£302·45** *fN*

VS-112
VISCOMETER, rotating cylinder, *Ferranti* **Model VL,** as VS-110 but **for use at temperatures up to 100°C.** For 200/250V 50 Hz single phase supplies. Each **£313·25** *fN*

VS-115
VISCOMETER, rotating cylinder, *Ferranti* **Model VM,** with set of VM, VH and VL cylinders and 20 g cm torque spring. Viscosity range 0·33 to 1460 poise; speed range 15 to 159·1 rev/min; shear rate 4·7 to 508 sec^{-1}. **For use at temperatures up to 30°C.** In leather case. For 200/250V 50 Hz single phase supplies ... Each **£305·60** *fN*

VS-117
VISCOMETER, rotating cylinder, *Ferranti* **Model VM,** as VS-115 but **for use at temperatures up to 100°C.** For 200/250V 50 Hz single phase supplies. Each **£316·40** *fN*

For direct determination of the flow properties of true or thixotropic liquids in the laboratory at temperatures up to 100°C

VS-110

Gallenkamp FLOW CUPS

Type No.	Orifice dimensions mm		Approximate viscosity range *, stokes
	Diameter	Length	
B 2	2·38	4·62	0·1 to 1
B 4	3·97	5·26	0·8 to 7
B 6	7·14	6·50	6·0 to 30
FORD No. 4	3·97	—	1 to 10

* These figures are quoted for guidance only. Non-Newtonian behaviour and anomalous flow can cause an apparent variation from these ranges and BS 1733 advises against conversion of flowtimes to viscosities.

VS-132
FLOW CUP, *Gallenkamp,* **BS 1733 type B2,** orifice dimensions as above tabulation. In nickel plated brass with integral skirt to protect the orifice ... Each **£5·75** *b*

VS-134
FLOW CUP, *Gallenkamp,* as VS-132 but **BS 1733 type B4** ... ... Each **£5·75** *b*

VS-136
FLOW CUP, *Gallenkamp,* as VS-132 but **BS 1733 type B6** ... ... Each **£5·75** *b*

VS-132 to VS-140

VS-145

VS-140
FLOW CUP, *Gallenkamp,* **FORD No. 4,** adjusted to give a flow time of 50 seconds with an oil having a viscosity of 1·63 stokes. In nickel plated brass with integral skirt to protect the orifice ... ... Each **£6·25** *b*

ACCESSORY
VS-145 **Stand for VS-132 to VS-140** with enamelled base, levelling feet and chromium plated rod with adjustable support bracket ... ... Each **£2·60** *b*

Redwood Viscometers—see PH-710 et seq. in List No. sequence.

Items on this page normally available from stock except those coded *N.*

FLOW CUPS

VS-160 with TJ-970

VS-160

VISCOMETERS, ZAHN FLOW CUP, stainless steel, for the rapid, approximate measurement of the viscosities of clear and opaque fluids. The 44 ml capacity cup has a precision reamed orifice at the bottom and is suspended from a looped wire handle 30 cm in length. The viscometer is used by dipping the cup into the fluid to be tested, withdrawing it and timing the duration of the outflow. A bracket is mounted on the handle for fitting a bimetallic dial thermometer for simultaneous temperature measurement.

Size No.	1	2	3	
Viscosity range	20–85	30–170	170–550	cP
Orifice diameter	0·078	0·108	0·148	in

Size No.	4	5		
Viscosity range	200–900	250–1200	cP	
Orifice diameter	0·168	0·208	in	
All size Nos.		Each	**£7·50**	*f*

When ordering please state size required.

ACCESSORY

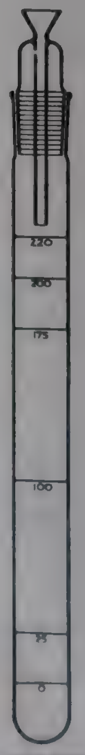
TJ-970 **Dial thermometers,** bimetallic with stainless steel case and stem 200 mm long.

Scale span	−10 to 110	0 to 220	0 to 400 °C
Subdivision	1	2	5 degC

For prices see entry in List No. sequence.

Technico FALLING SPHERE VISCOMETERS

REGD. TRADE MARK



VS-202

VS-202

VISCOMETERS, FALLING SPHERE, *Technico*, to BS 188, borosilicate glass, comprising a fall tube, graduated at six points, fitted with a 24/29 socket and a stopper with a ball release tube with a 24/29 cone. **Without balls.**

Int. dia. of fall tube	25	40 mm	
Each	**£2·10**	**2·25**	*a*

REPLACEMENT PARTS AND ACCESSORIES

VS-205 **Fall tubes,** with 24/29 socket, without steel balls or stopper.

Int. dia.	25	40 mm	
Each	£1·30	1·55	*a*

VS-206 **Steel balls,** density 7·785 g/cm³. Viscosity ranges quoted in thousands cS. In packs of 100.

Diameter	1/16	3/32	1/8	5/32 in	
Viscosity range					
from	1·1	2·5	4·5	7·0	
to	37·4	84·0	150·0	234·0	
Pack	£0·35	0·20	0·20	0·20	c

The 1/16 in and 3/32 in balls are suitable for both tubes, and the 1/8 in and 5/32 in balls for the 40 mm tube only.

VS-207 **Stopper,** with 24/29 cone and ball release tube. Each £0·70 *a*

All items on this page normally available from stock.

Technico STANDARD U-TUBE VISCOMETERS

REGD. TRADE MARK

VS-220

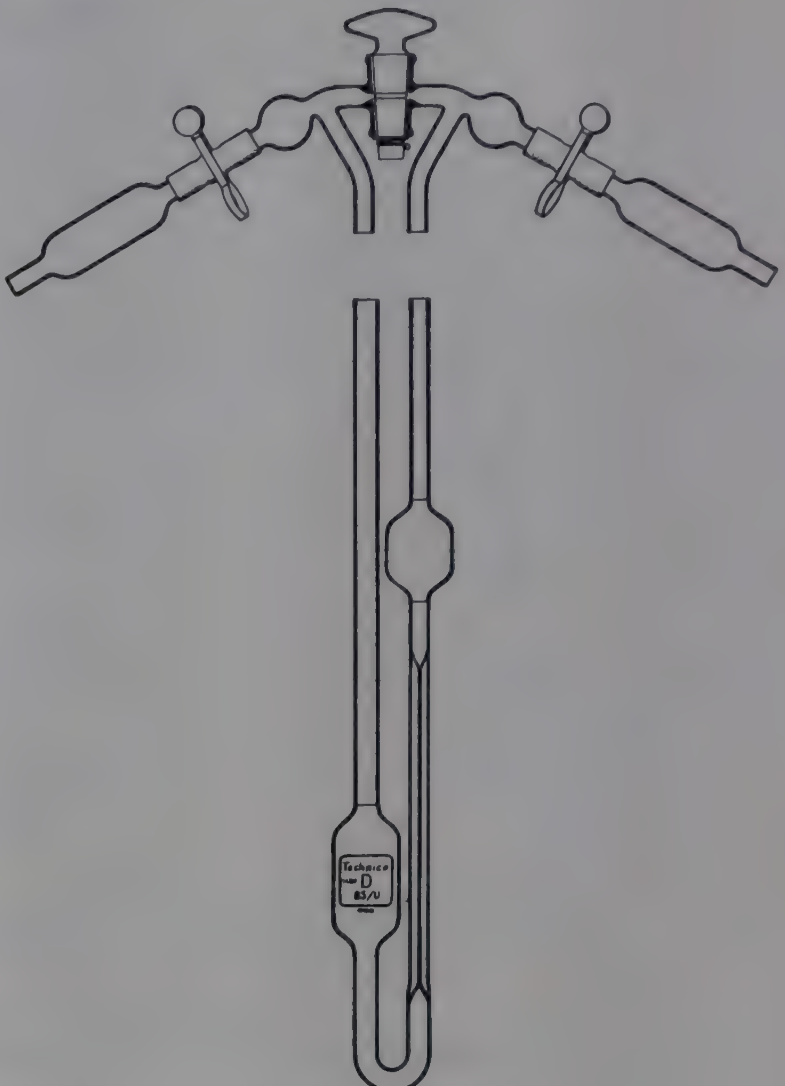
VISCOMETERS, STANDARD U-TUBE, *Technico,* type BS/IP, to ASTM D445–IP 71 and ASTM D2515, and type BS/U to BS 188. For transparent liquids.

Viscometer size	O	A	B	C	D	
Nominal constant	0·001	0·003	0·01	0·03	0·1	cS/s
Viscosity range, approx.	0·3–3	1·5–10	4–10	7·5–35	20–120	cS

All sizes Dozen **£28·00** Each **£2·65** *a*

Viscometer size	E	F	G	H	
Nominal constant	0·3	1·0	3·0	10	cS/s
Viscosity range, approx.	60–500	200–1,000	600–4,000	2,000–15,000	cS

All sizes Dozen **£28·00** Each **£2·65** *a*



VS-220 with VS-228

VS-225

VISCOMETERS, STANDARD U-TUBE, *Technico,* as VS-220 but with **works certificate of examination giving the calibration constant** ... ... Each **£7·00** *a*

VS-227

VISCOMETERS, STANDARD U-TUBE, *Technico,* as VS-220 but with **NPL certificate of examination giving the calibration constant** ... ... Each **£17·25** *a*

When ordering VS-225 and VS-227 please state viscometer size required.

ACCESSORY

VS-228 **Sealing device,** for viscometers VS-220 to VS-227 comprising stopcock branch tube and two desiccant bulbs... Set **£2·00** *a*

Technico REVERSE FLOW U-TUBE VISCOMETERS

REGD. TRADE MARK

VS-250

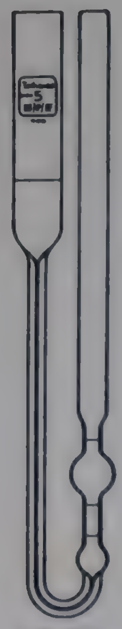
VISCOMETERS, REVERSE FLOW U-TUBE, *Technico,* reverse flow type BS/IP U-tube to ASTM D445–IP 71 and ASTM D2515, and type BS/IP/RF to BS 188. For transparent and opaque liquids.

Viscometer size	1	2	3	4	5	6	
Nominal constant	0·003	0·01	0·03	0·1	0·3	1	cS/s
For min. viscosity	1·2	2	6	20	60	200	cS

All sizes Dozen **£33·00** Each **£3·10** *a*

Viscometer size	7	8	9	10	11	
Nominal constant	3	10	30	100	300	cS/s
For min. viscosity	600	2,000	6,000	20,000	60,000	cS

All sizes Dozen **£33·00** Each **£3·10** *a*



VS-250

VS-255

VISCOMETERS, REVERSE FLOW U-TUBE, *Technico,* as VS-250 but with **works certificate of examination giving the calibration constant.** Each **£9·25** *a*

VS-257

VISCOMETERS, REVERSE FLOW U-TUBE, *Technico,* as VS-250 but with **NPL certificate of examination giving the calibration constant.** Each **£38·00** *a*

When ordering VS-255 and VS-257 please state viscometer size required.

ACCESSORY

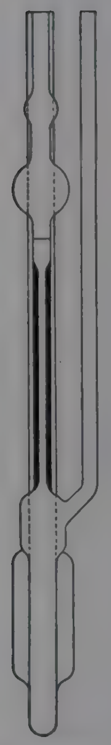
VS-258 **Pipette,** for adjusting filling level in viscometers VS-250 to VS-257. Each **£0·65** *a*

All items on this page normally available from stock.

Technico SUSPENDED LEVEL VISCOMETERS

REGD. TRADE MARK

Type BS/IP/SL



VS-280

VS-280

VISCOMETERS, SUSPENDED LEVEL, *Technico*, suspended level type BS/IP/SL, to ASTM D445–IP 71, ASTM D2515 and BS 188. For transparent liquids.

Viscometer size	1	1A	2	2A	3	
Nominal constant	0·01	0·03	0·1	0·3	1	cS/s
For min. viscosity	3·5	6	20	60	200	cS

All sizes Dozen **£30·00** Each **£2·80** *a*

Viscometer size	3A	4	4A	5	
Nominal constant	3	10	30	100	cS/s
For min. viscosity	600	2000	6000	20000	cS

All sizes Dozen **£30·00** Each **£2·80** *a*

VS-285

VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-280 but with **works certificate of examination giving the calibration constant.**

Each **£7·10** *a*

VS-287

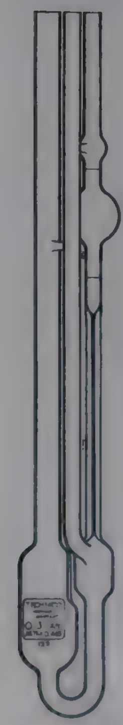
VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-280 but with **NPL certificate of examination giving the calibration constant.**

Each **£17·35** *a*

When ordering VS-285 and VS-287 please state viscometer size required.

Technico UBBELOHDE SUSPENDED LEVEL VISCOMETERS TO ASTM D445-IP71

REGD. TRADE MARK



VS-290

VS-290

VISCOMETERS, SUSPENDED LEVEL, *Technico*, Ubbelohde suspended level to ASTM D445–IP 71 and ASTM 2515. For transparent liquids.

Viscometer size	1	1C	1B	2	2C	
Nominal constant	0·01	0·03	0·05	0·1	0·3	cS/s
Viscosity range, approx.	2–10	6–30	10–50	20–100	60–300	cS

All sizes Dozen **£33·00** Each **£3·10** *a*

Size No.	2B	3	3C	3B	4	
Nominal constant	0·5	1·0	3·0	5·0	10·0	cS/s
Viscosity range, approx.	100–500	200–1000	600–3000	1000–5000	2000–10,000	cS

All sizes Dozen **£33·00** Each **£3·10** *a*

VS-295

VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-290 but with **works certificate of examination giving the calibration constant.**

Each **£7·30** *a*

VS-297

VISCOMETERS, SUSPENDED LEVEL, *Technico*, as VS-290 but with **NPL certificate of examination giving the calibration constant.**

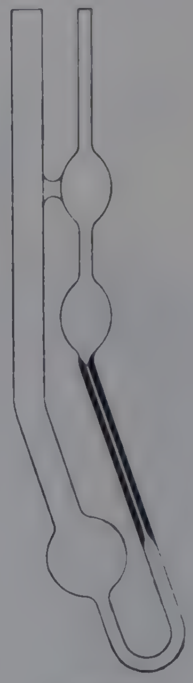
Each **£17·55** *a*

When ordering VS-295 and VS-297 please state viscometer size required.

All items on this page normally available from stock.

Technico CANNON–FENSKE VISCOMETERS
REGD. TRADE MARK

Type BS/IP/CF



VS-310

VISCOMETERS, CANNON-FENSKE, *Technico*, Cannon-Fenske routine to ASTM D445–IP 71 and ASTM D2515, and type BS/IP/CF to BS 188. For transparent liquids.

Viscometer size	25	50	100	150	200	300	
Nominal constant	0·002	0·004	0·015	0·035	0·1	0·25	cS/s
Viscosity range, approx.	0·4–1·6	0·8–3·2	3–12	7–28	20–80	50–200	cS

All sizes Dozen **£30·00** Each **£2·80** *a*

Viscometer size	350	400	450	500	600	
Nominal constant	0·5	1·2	2·5	8	20	cS/s
Viscosity range, approx.	100–400	240–960	500–2,000	1,600–6,400	4,000–16,000	cS

All sizes Dozen **£30·00** Each **£2·80** *a*

VS-315

VISCOMETERS, CANNON-FENSKE, *Technico*, as VS-310 but with **works certificate of examination giving the calibration constant.** Each **£7·10** *a*

VS-317

VISCOMETERS, CANNON-FENSKE, *Technico*, as VS-310 but with **NPL certificate of examination giving the calibration constant.** Each **£17·35** *a*

When ordering VS-315 and VS-317 please state viscometer size required.

VS-310

Technico MASTER U–TUBE VISCOMETERS
REGD. TRADE MARK

VS-340

VISCOMETER, MASTER U-TUBE, *Technico*, type BS/IP/MV, to BS 188. Each **£4·40** *a*

VS-350

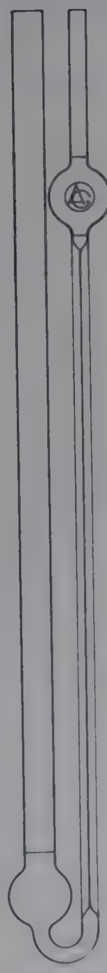
VISCOMETER, MASTER SUSPENDED LEVEL, *Technico*, type BS/IP/SL/MV, to BS 188 ... ... Each **£5·15** *a*

THERMOSTATIC BATH and viscometer holders suitable for Master Viscometers, details on application.

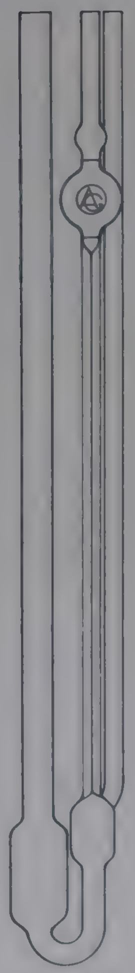
Dust in Capillary Viscometers

It is perhaps not well known that dust particles are often responsible for poor results from viscometers with constants of 0·3 cS/sec or less. An effective cure for the trouble is to filter all washing solvents and all samples through sintered glass filters of porosity 1. Clean viscometers must be kept covered and our laboratories report that during use a short length of 1 mm bore glass tubing attached by rubber tubing prevents the ingress of dust. Dust particles are difficult to see but fortunately most are doubly refracting. Thus they become clearly visible when the sample containing them is viewed between crossed Polaroid film sheets.

For good repeatable viscometry the apparatus must be clean. Satisfactory cleaning can be achieved using Cleansing Fluid CM-751 and Ultrasonic Bath UL-150. For details and prices see entries in List No. sequence.



VS-340

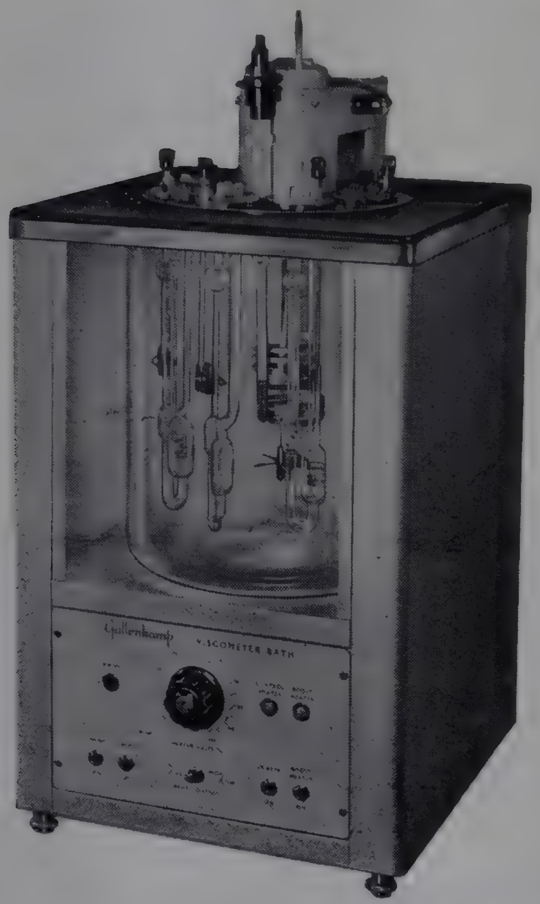


VS-350

All items on this page normally available from stock.

Gallenkamp VISCOMETER BATH, 120°C

For the determination of kinematic viscosity by capillary viscometer methods including those specified in ASTM D445—IP71, BS 188, DIN 51550 and 51562. Also for any other methods involving the precise measurement of viscosity such as control of polymer molecular weight by specific or relative viscosity measurement.



VS-615 with accessories

- **Unique turntable holder permits each viscometer to be brought to the front as required**
- **Workspace illuminated brilliantly but without glare**
- **Temperature controlled with maximum precision**
- **Designed for easy cleaning and simple maintenance**
- **Built-in boost for initial heating**
- **Suitable for use up to 120°C (250°F)**

PERFORMANCE AND OPERATION

Overall temperature range		Ambient (with cooling coil) to 120°C
Temperature fluctuation	Up to 40°C	±0·005degC
	Up to 100°C	±0·015degC

To minimise temperature fluctuations resulting from thermostat switching, two energy input controls are provided. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable auto-transformer.

Thermostatic control is by contact thermometers which have short ranges to suit all the common standard test temperatures.

Contact thermometer range	To suit test temperatures
27°F— 37°F	0°C
60°F— 80°F	20°C, 25°C, 70°F
80°F—110°F	100°F
115°F—135°F	50°C, 130°F
125°F—145°F	60°C, 140°F
195°F—215°F	100°C, 200°F, 210°F

For operation at temperatures within the overall range of the viscometer bath but outside the ranges tabulated above, contact thermometers are available to special order.

CONSTRUCTION

The viscometer bath is a compact and completely self-contained unit comprising a borosilicate glass tank, with a sand blasted diffusion area at the rear. The tank is enclosed in a grey stoved enamel finished steel case with levelling feet. The case, which has a white interior, is fitted with a toughened glass front window and a laminated plastics top. A freely moving annular turntable with positions for eight viscometer holders is built into the top and permits each viscometer as required to be brought to the front without disturbance. Blank covers are available for turntable positions not in use. The thermoregulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. The fluorescent lamp is mounted on the rear panel of the case behind the diffuser panel of the glass tank.

NOTE: For temperatures up to 60°C water is a suitable bath liquid but for continuous working above this temperature ethylene glycol or white mineral oil may be used to advantage.

DIMENSIONS

	H		W		D
Overall	73	×	50	×	40 cm
	29	×	20	×	16 in

Power rating, max. 1000W.

Gallenkamp VISCOMETER BATH

VS-615

VISCOMETER BATH, thermostatic, *Gallenkamp*, for temperatures up to 120°C (250°F), as specification, comprising cylindrical borosilicate glass tank, fluorescent lamp, stirring motor and paddle, viscometer turntable, control and boost heaters and variable autotransformer. **Without viscometers, viscometer holders, contact thermometer or indicating thermometer.** For single phase supplies only.

220/240V 50 Hz	Each	**£215·00**	*b*
200/210V 50 Hz	Each	**£217·00**	*bN*
110/120V 60 Hz	Each	**£225·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

VS-620	**Heater,** 500W, long, for normal heating.	Each	**£6·00**	*b*
VS-621	**Heater,** 500W, short for boost heating.	Each	**£5·25**	
OD-124	**Stirrer motor.** For price see entry in List No. sequence.			
VS-627	**Tank,** borosilicate glass, with diffusing panel.	Each	**£14·50**	*m*
VS-629	**Lamp,** fluorescent, 8W	Each	**£0·45**	*m*

When ordering replacement parts please state serial number of viscometer bath and supply voltage.

ACCESSORIES

Four types of viscometer holders are listed which between them can accommodate the most popular range of viscometers described in BS 188 and ASTM D445–IP 71. Types of viscometer for which the four holders are suitable are shown in the table below.

VS-630	**Viscometer holder**	Each	**£2·70**	*b*
VS-632	**Viscometer holder**	Each	**£2·70**	*b*
VS-633	**Viscometer holder**	Each	**£2·70**	*b*
VS-634	**Viscometer holder**	Each	**£2·70**	*b*
VS-638	**Blank cover**	Each	**£1·05**	*b*

VS-639 **Contact thermometers,** with connector.

Range	27–37	60–80	80–110°F	
Each	**£9·00**	**9·00**	**9·00**	*c*
Range	115–135	125–145	195–215°F	
Each	**£9·00**	**9·00**	**9·00**	*c*

Indicating thermometers, IP Kin Visc, see TK-546 to TK-558 in List No. sequence.

VS-641	**Cooling coil,** for operating bath below or near to ambient temperature. With connections for 8–9 mm bore flexible tubing	Each	**£2·50**
LX-110	**Lubricant,** suitable for stirrer motor. For price see entry in List No. sequence.		

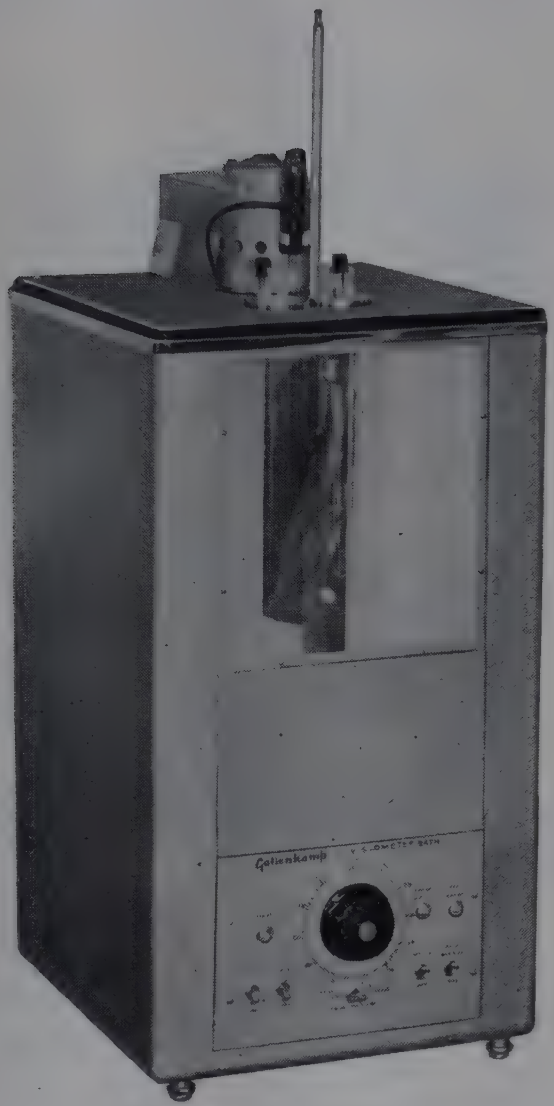
U-TUBE VISCOMETERS to IP, BS and ASTM specifications see VS-220 to VS-350 on pages 783 to 785.

Viscometer Holder List No.	Suitable for Viscometers				
	List No.	Sizes	Specification	Description	Type
VS-630	VS-220	All	ASTM D445–IP 71 ASTM D2515 BS 188	U-tube U-tube	BS/IP BS/U
	VS-280	1–4	ASTM D445–IP 71 ASTM D2515, BS 188	Suspended level	BS/IP/SL
VS-632	VS-280	4A and 5	ASTM D445–IP 71 ASTM D 2515, BS 188	Suspended level	BS/IP/SL
VS-633	VS-290	All	ASTM D445–IP 71 ASTM D2515	Suspended level	Ubbelohde
VS-634	VS-250	All	ASTM D445–IP 71 ASTM D2515 BS 188	Reverse flow Reverse flow	BS/IP U-tube BS/IP/RF
	VS-310	All	ASTM D445–IP 71 ASTM D2515 BS 188	Cannon-Fenske Cannon-Fenske	Routine BS/IP/CF

Items on this page normally available from stock except those coded *N*.

Gallenkamp HIGH TEMPERATURE VISCOMETER BATH, 250°C

For viscosity determinations at temperatures between 30 and 250°C


VS-670 with accessories

- **Dewar pattern bath for minimum heat loss**
- **Insulated top with holes to accept two viscometer holders**
- **Workspace illuminated brilliantly but without glare**
- **Temperature controlled with maximum precision**
- **Designed for easy cleaning and simple maintenance**
- **Built-in boost for initial heating**

PERFORMANCE AND OPERATION

Temperature ranges:	
using water	Ambient +10degC to 60°C
using white oil	60°C to 120°C
using silicone oil	120°C to 250°C
Temperature fluctuation	±0·025degC
Heating time to 250°C	2½ hours

To minimise temperature fluctuations resulting from thermostat switching, two energy input controls are provided. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable auto-transformer.

Thermostatic control is by contact thermometer. A contact thermometer range 0–250°C is available but, to obtain the minimum fluctuation a narrow range (25°C) thermometer is recommended. Nine of these covering adjacent ranges from 25–50°C up to 225–250°C are offered.

CONSTRUCTION

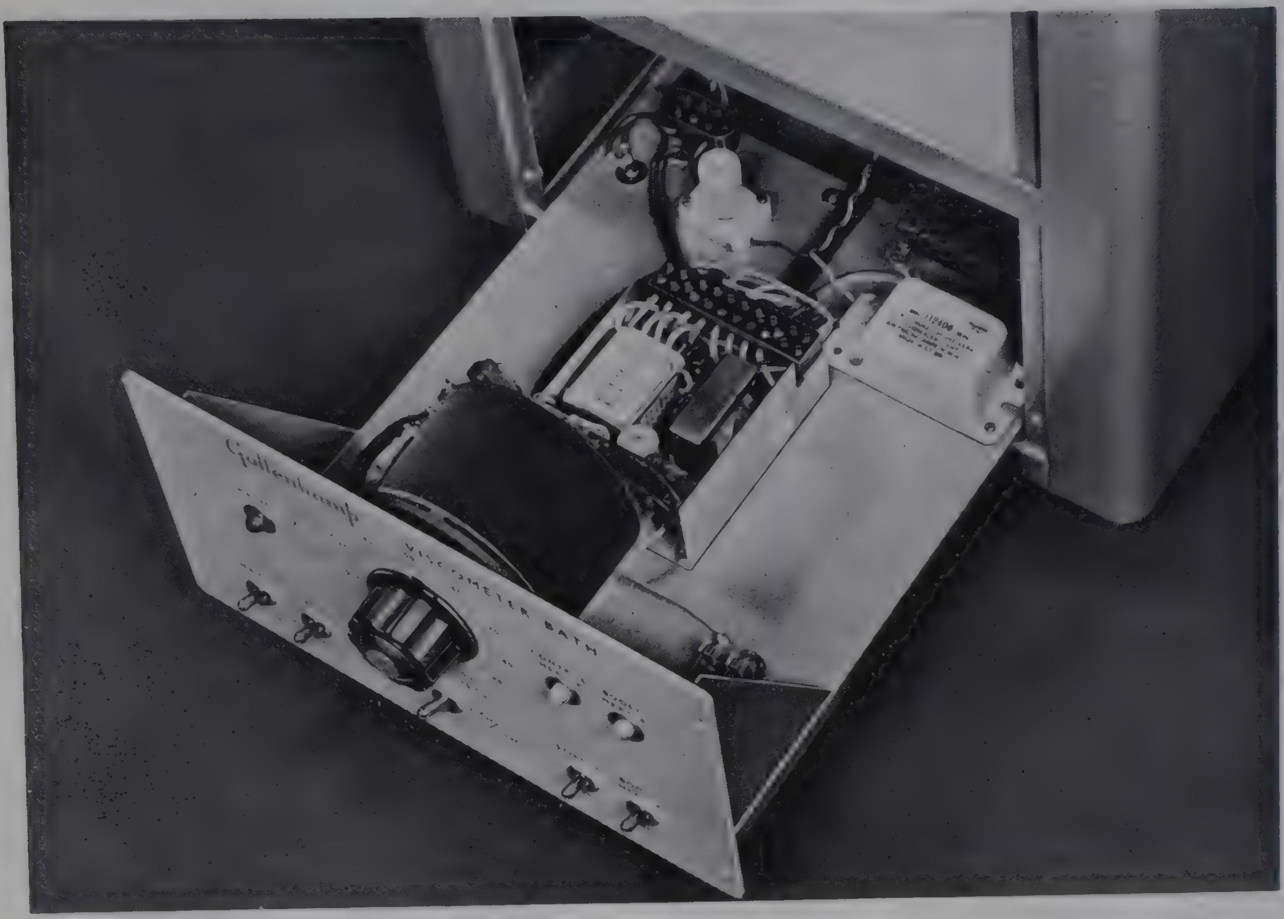
The viscometer bath is a Dewar flask, internally silvered apart from clear strips at the front and back for illuminating and viewing the viscometers. The bath is housed in a grey stoved enamel finished steel case with a toughened glass front window, asbestos lined laminated plastics top and levelling feet. The top cover has holes to accept two purpose-made viscometer holders with insulated tops. When not in use, these may be replaced by insulated blank covers. The thermoregulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. The fluorescent lamp is situated behind the bath, on the rear panel of the case.

DIMENSIONS

	H	W	D
Overall	82 ×	50 ×	40 cm
	32 ×	20 ×	16 in

Power rating, max. 1000W.

Gallenkamp HIGH TEMPERATURE VISCOMETER BATH



View of control chassis of *Gallenkamp* Viscometer Bath showing transistorised relay used for switching energy to the heater.

VS-670

VISCOMETER BATH, thermostatic, high temperature, *Gallenkamp*, for temperatures up to 250°C, as specification with cylindrical Dewar bath, fluorescent lamp, stirring motor and paddle, insulated covers for test positions, control and boost heaters and variable auto-transformer. **Without viscometers, viscometer holders, contact thermometers, measuring thermometer or filling liquid.** For single phase supplies only.

220/240V 50 Hz	Each **£330·00**	*b*
200/210V 50 Hz	Each **£332·00**	*bN*
110/120V 60 Hz	Each **£335·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

VS-672	**Bath,** Dewar vessel only...	Each **£12·90**	*b*
VS-620	**Heater,** 500W, long, for normal heating	For prices see entries in List No. sequence.	
VS-621	**Heater,** 500W, short, for boost heating		
OD-124	**Stirrer motor**		
VS-629	**Lamp,** fluorescent, 8W		

When ordering replacement parts please state serial number of viscometer bath and supply voltage.

ACCESSORIES

The list of accessories includes contact thermometers, viscometer holders, and special viscometers with extended limbs. Due to the variety of different sizes and types of viscometers it is not practicable to hold stocks but any type can be made to special order to suit the viscometer bath.

VS-685 **Contact thermometer,** with connector, long range 0–250°C with lead and plug ... ... Each **£13·25** *b*

VS-688 **Contact thermometers,** with connectors, short range as follows:
25–50°C, 50–75°C, 75–100°C, 100–125°C 125–150°C, 150–175°C, 175–200°C, 200–225°C, 225–250°C.
Each **£15·50** *b*

When ordering please state range or ranges required.

VS-690 **Viscometer holders,** with insulated tops.
Each **£13·00** *b*

When ordering please state size and type of viscometer to be used.

VS-694 **Viscometers, extended limbs,** for use with VS-690.

Type	BS/IP	BS/IP/RF	BS/IP/SL	BS/IP/CF

All sizes and types Each **£4·25** *aN*

Sizes as for appropriate viscometers VS-220, VS-250, VS-280 and VS-310 on pages 783 to 785.

When ordering please state size and type of viscometer

LX-110 **Lubricant,** suitable for stirrer motor. For price see entry in List No. sequence.

Items on this page normally available from stock except those coded *N*.

VOLUMETRIC GLASSWARE

USEFUL DATA

BRITISH STANDARDS

All articles for which British Standards (BS) exist are manufactured to such standards, the remainder being made to our own stringent specifications.

Most British Standards for volumetric glassware are in line with the requirements of the International Organisation for Standardization (ISO).

CALIBRATION TEMPERATURE

British Standards specify that volumetric glassware should be calibrated at 20°C. In accordance with ISO recommendations however an alternative temperature of 27°C is permitted for glassware to be used in tropical countries.

In the case of borosilicate glassware, the true volumetric difference resulting from calibration at one or other of these two standard temperatures can largely be ignored in practice.

It can be calculated that, for a 2000 cm^3 flask, the difference in volume resulting from the 7degC difference between calibration temperatures is less than one quarter of the permitted Class A tolerance. For the majority of other volumetric glassware including burettes, cylinders, flasks, bulb pipettes and divided pipettes, the difference is much less than even this small amount, and in many cases is negligible.

With soda-lime glass vessels the difference is approximately three times that for borosilicate glass, but in every case the difference is still within the BS Class A tolerance.

Examples of error in capacity between borosilicate glass vessels **calibrated** at 20°C and **used** at 27°C.

Vessel	Nominal capacity cm^3	Error expressed as a fraction of the allowed Class A tolerance
Burette	25	1/20
Cylinder	100	1/100
Flask	1000	1/5
Bulb Pipette	50	1/10
Divided Pipette	25	1/20

WORKING TEMPERATURE

It has been explained above that a few degrees difference between the working temperature of borosilicate glass vessels and the calibration temperature has little significant effect on their capacities.

By contrast, however, the temperatures of the liquids which they contain must be taken into account. This is because most liquids have large absolute coefficients of expansion; for example dilute aqueous solutions commonly used in analyses have coefficients at least 10 times that for glass vessels. Thus when an item of volumetric glassware is required to contain (In) or deliver (Ex) its stated capacity it is important that the aqueous solution temperature be as close as possible to the calibration temperature. For most practical purposes however, where several different items of volumetric glassware are being used together, the working temperature is not important provided all aqueous solutions are at approximately the same temperature.

UNIT OF CAPACITY

With the adoption of the SI system of units, the 1901 definition of the litre was abandoned. The term litre is now a synonym for the cubic decimetre.

Details of the SI system and the reasons which led to its adoption will be found in BS 3763.

METHODS OF USE

To obtain accurate results from volumetric glassware it is desirable that the method of use should be as close as possible to the method by which the article was originally calibrated. Methods of verification are detailed in each BS and in most instances provide a valuable guide to the best method of use.

Much useful information on accuracy and methods of use will be found in:

Notes on Applied Science No. 6, Volumetric Glassware, 1954, Her Majesty's Stationery Office.

Microdiffusion Analysis and Volumetric Error by E. J. Conway, M.B., D.Sc., F.R.S.

STOPCOCK LUBRICATION

Only a minimum of lubricating grease should be smeared evenly over the surface of the key.

NEVER use silicone grease to lubricate stopcocks on volumetric glassware because during use it 'migrates' and contaminates the inner surface of the glass. Such contamination prevents wetting of the glass, distorts the meniscus, alters drainage and thus destroys accuracy.

CLEANING

Always keep volumetric glassware clean and free from grease. A distorted meniscus or irregular drainage from the walls has a serious effect on accuracy. Organic solvents, sulphuric acid—dichromate mixture and modern detergents are effective cleaning materials. Articles should be filled with rather than immersed in the cleaning solution. Thorough cleaning can usually be achieved by using an ultrasonic bath. After cleaning glassware should be rinsed with distilled water. If allowed to dry without rinsing, stains may form inside which are often difficult to remove.

Technico VOLUMETRIC GLASSWARE

REGD. TRADE MARK

GRADES OF ACCURACY

Most items of *Technico* volumetric glassware are available as follows:—

Technico BST stamped Class A.

REGD TRADE MARK

Primarily used for referee purposes, marked with the BST monogram and supplied complete with test certificate showing the value of any corrections to be applied.

Technico Class A.

REGD TRADE MARK

Available with or without works certificate and of similar quality to the BST grade and equally suitable for work of the highest degree of accuracy. It meets all BS requirements for Class A and works certificates are issued on the basis of BST approved methods of test which in the case of divided scale articles, give measured values at 5 test points. All corrections are given to the same degree of accuracy as on the corresponding BST certificates.

Technico Class B.

REGD TRADE MARK

Manufactured to BS Class B requirements to provide a reliable quality for routine work.

CALIBRATION

The methods of calibration and, where appropriate, a sampling of finished *Technico* volumetric glassware are checked gravimetrically using BS 1797 'Tables for use in the calibration of volumetric glassware'. These tables provide correction figures for variations of temperature and barometric pressure and enable weight in grammes to be converted into capacity in cubic centimetres. Such tables are useful in any laboratory where accurate checking of volumetric glassware is carried out.

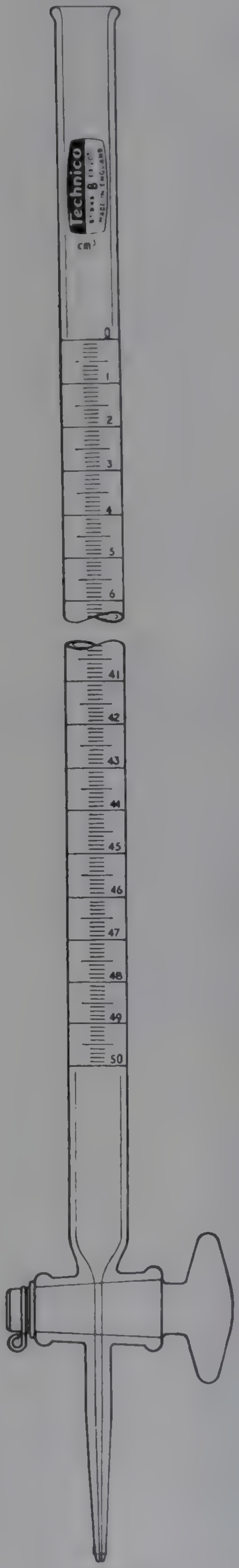
INSCRIPTIONS

All *Technico* volumetric glassware carries full BS inscriptions and the S.I. unit of capacity 'cm³'. In accordance with ISO recommendations, British Standards require the use of 'In' on flasks and other articles calibrated to contain a stated capacity, and 'Ex' on burettes, pipettes, etc., calibrated to deliver a stated capacity. These abbreviations are designed to minimise language difficulties in non-English speaking countries and have been adopted on all *Technico* volumetric glassware.

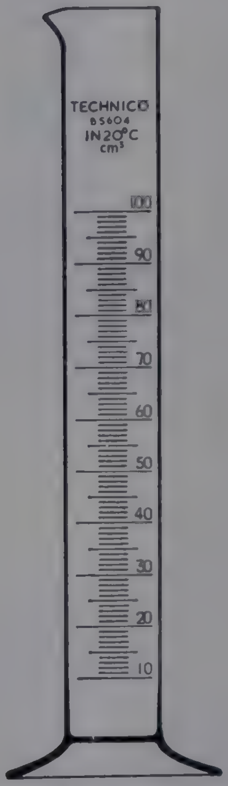
Most *Technico* volumetric glassware has graduations and inscriptions applied as a dark brown stain which is completely resistant to all reagents except those which attack the glass itself. The white enamel used on other items is among the most resistant available but cannot be guaranteed not to discolour by repeated immersion in cleaning solutions.

STOPCOCKS

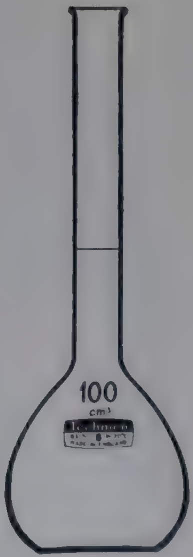
All stopcocks on *Technico* volumetric glassware are ground to a high quality finish and are fitted with rust-resistant retaining springs. Interchangeable stopcocks of *Gallenkamp* high quality manufacture are fitted to many types of *Technico* burettes and can be supplied to order on many other articles.



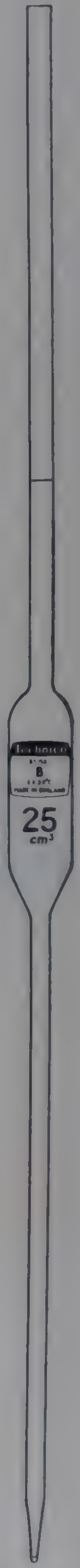
Technico
Burettes



Technico
Cylinders



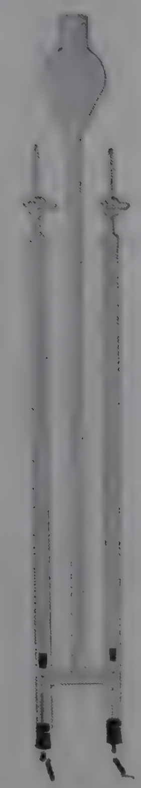
Technico
Flasks



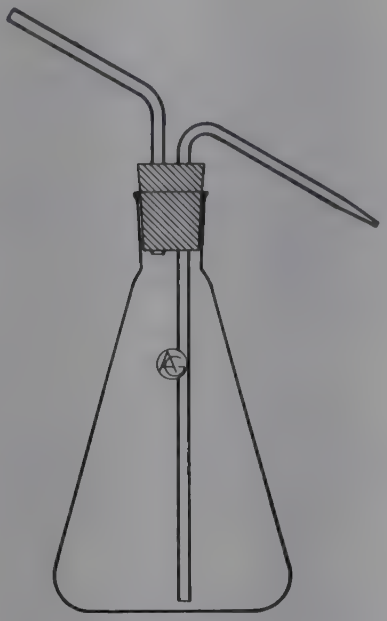
Technico
Pipettes

For other *Technico* items refer to the Index under heading *Technico.*

When ordering, specify *Technico* volumetric glassware and insist on receiving apparatus bearing our registered trade mark.



VX-022 with VX-023



WB-040

VOLTAMETER

VX-022

VOLTAMETER, electrolytic, Hofmann, for demonstration of electrolysis of water and dilute acids and measurement of the products of dissociation. With two limbs graduated 50 cm^3 in 0·2 cm^3, two straight bore stopcocks but **without electrodes** ... Each **£4·75** *m*

ACCESSORIES

VX-023 **Electrodes, platinum,** mounted with stoppers for voltameter VX-022 ... ... Pair **£1·65** *m*

GLASS WASHBOTTLE

WB-040

WASHBOTTLES, Ⓐ, borosilicate glass, with rubber stopper and bent tubes, one drawn to a fine jet. Capacity 500 ml ... ... Ten **£4·10** Each **£0·46** *b*

Gallenkamp POLYTHENE WASHBOTTLES

WB-100

A streamlined design of squeeze bottle, easy to handle and control. The white polythene cap seals positively but is readily released. Caps are available in other colours if required for colour coding. The larger bottle holds a full Imperial pint.

- Translucent wall shows level of contents
- Stand firmly on the bench
- Come naturally to the hand
- Deliver a powerful, clean jet
- Refill without tilting or removing jet
- Stepped bore for adjusting jet diameter

WB-100

WASHBOTTLES, *Gallenkamp*, **polythene.**

Capacity	250	600 ml	
Dozen	**£1·90**	**3·10**	*b*
Each	**£0·23**	**0·32**	

ACCESSORIES

WB-105 **Caps, coloured polythene,** for colour coding above bottles. In packs of 12 of one colour.

Colour	Red	Yellow	
10 packs	**£1·80**	**1·80**	*b*
Pack	**£0·25**	**0·25**	

When ordering please state colour required.

All items on this page normally available from stock.

WASHING EQUIPMENT

WD-020

BOTTLE WASHER, for thoroughly rinsing the interiors of bottles with neck diameter between 9·5 mm and 10 cm at an approximate rate of 600/hour. Comprises a spring loaded nozzle mounted on a rigid base with a length of 3-ply hose and a tap adapter. The sloping top surface of the distributor is channelled to allow water to flow away and is fitted with four plastics coated sidearms to support larger bottle necks ... ... Each **£9·25** *f*

ACCESSORY

WD-028 **Nozzle,** for test tubes and syringes, with four plastics coated sidearms ... ... Each **£1·87** *f*

WD-020

WD-050

WASHING MACHINE, electrically operated, with a quick release chuck taking a wide variety of interchangeable nylon brushes for cleaning syringes, test tubes and round bottles up to 250 ml. Mounted on a cast aluminium base with a Perspex anti-splash shield, a white enamelled tray and incorporating a $\frac{1}{16}$ hp motor for 200/250V 50 Hz single phase supplies. Dimensions 62·5×27×25 cm.
Without brushes ... ... Each **£82·00** *m*

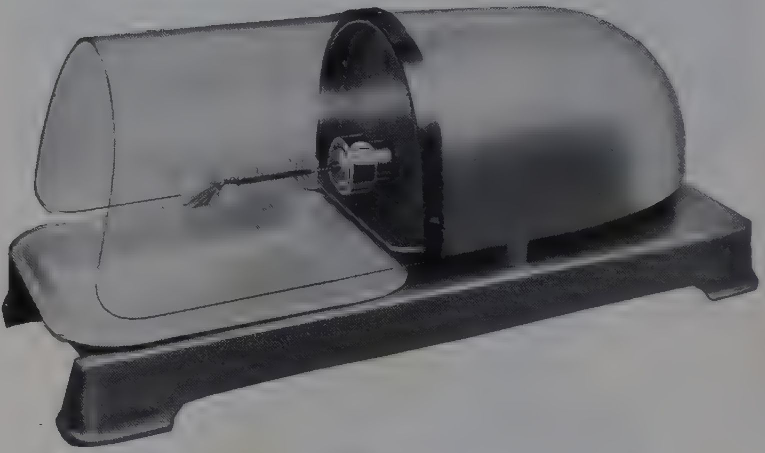
ACCESSORIES

WD-060 **Brushes,** nylon, for round bottles.

Capacity	30	120	250 ml]	
Ten	£2·50	3·00	3·30	*m*
Each	£0·31	0·36	0·39	

WD-064 **Brushes,** nylon, for test[tubes.

Diameter	8	11	14	19	22	25 mm	
Ten	£2·10	2·20	2·40	2·40	2·50	2·50	*m*
Each	£0·27	0·28	0·31	0·31	0·31	0·31	



WD-050

PIPETTE WASHERS

The washers are a moulded construction which is weld and seam free. The water inlet being at the top minimises the risk of back siphoning even if there is a drop in the water pressure. Will operate with water inputs from 2 to 12 litres/min.

***WD-120**

PIPETTE WASHERS, polythene, automatic siphoning, as specification. Supplied with PVC tubing for water inlet and outlet nozzles, but without basket or soaking jar. Internal diameter 16·5 cm.

For max. pipette length	35	60 cm	
Each	**£12·00**	**20·00**	*m*

ACCESSORIES

***WD-124** **Basket, polythene,** perforated, with lifting handle. Internal diameter 12·5 cm. Suitable for use with both sizes of washer WD-120 ... ... Each **£3·20** *m*

WD-126 **Soaking jar, polythene,** moulded construction, weld and seam free.

For max. pipette length Int. dia.	35 15	60 cm 17·5 cm	
Each	£2·50	4·50	*m*

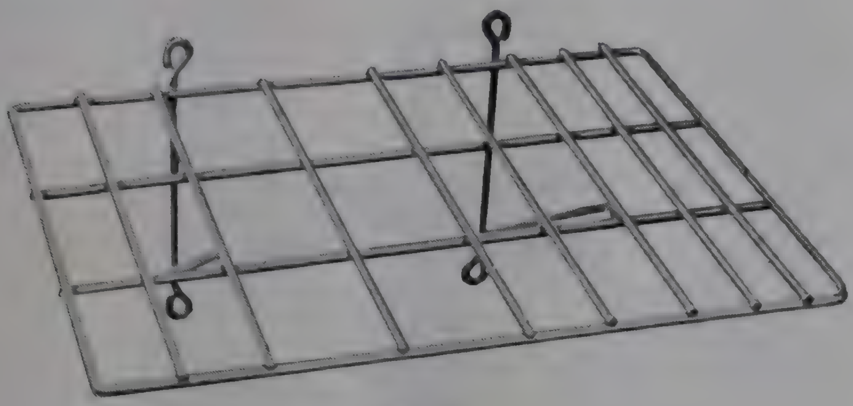
WD-120

WASHING EQUIPMENT

Other items of washing and drying equipment are listed elsewhere in this catalogue as below:

Peg draining racks	see FW-550 and FW-554
Draining boards	see FW-558
Draining mat, polythene	see FW-570
Drying ovens for glassware	see OV-880 and WD-195

All items on this page normally available from stock.



WD-174

Gallenkamp DRAINING RACKS

Welded steel draining racks coated with a thick layer of polythene forming a hard wearing, resilient surface which resists corrosion and prevents scratching of the glassware. The struts are so spaced that each rack will accommodate glassware of several different sizes and shapes. Both racks are fitted with support brackets for wall mounting.

List No.	Dimensions		Each	
	in	cm		
			£	
WD-170	18×12	46×30	**2·00**	c
WD-174	24×18	61×46	**2·50**	c

DRAINING RACKS, polythene coated metal	see	FW-550
DRAINING RACKS, teak	see	FW-554
DRAINING BOARD, teak	see	FW-558
DRAINING MAT, polythene	see	FW-570

For details and prices see entries in List No. sequence.

WD-195

WD-195

DRYING CABINET, maximum temperature approximately 100°C. Comprises stove enamelled aluminium cabinet heated by a plate glass element in the base. Complete with 2 wire mesh shelves, toughened glass sliding doors, indicator lamp, power controller with OFF position and a separate ON/OFF switch.

Overall dimensions 72×38×49 cm high.

Internal dimensions 70×31×35 cm high.

Power rating, maximum 625 watts.

For 230/250V a.c. single phase supplies.

Each **£23·50** *m*

When ordering please state voltage and frequency of supply.

OV-880 with OV-892

Gallenkamp DRYING CABINET

A general purpose laboratory drying cabinet **for use up to 120°C.** Its many applications include the drying of glassware and sheets of chromatography paper up to 58×63 cm.

- Thermostatically controlled
- Large capacity
- Outlet for extraction ducting

For full details and prices see OV-880 in List No. sequence.

All items on this page normally available from stock.

Gallenkamp

REGD. TRADE MARK

GLASSWARE DRYERS

For the rapid drying of laboratory glassware; especially items such as cylinders and flasks with narrow necks which are difficult to dry by other means.

The base of each dryer encloses a powerful electrically driven blower. This draws room air through a filter, passes it through a heater and forces it through the apparatus support tube which has a number of holes near its top to ensure a good distribution of the air over the inside of the apparatus. Three interchangeable apparatus support tubes of 9·5, 16 and 25 mm outside diameter are supplied with the single point apparatus. The twelve point apparatus is supplied with 23 cm long 18 mm diameter general purpose tubes. Because the air is not recirculated a maximum drying rate is obtained. Both dryers are fitted with safety thermostats to protect them from overheating due to accidental interruption of the air circulation. A switch in the heater circuit enables cold air to be circulated if required.

WD-200

WD-200

GLASSWARE DRYER, *Gallenkamp*, single point, as specification. Overall height without tube, 28 cm, diameter 24 cm, power rating 200W. For 200/250V 50 Hz supplies ... ... Each **£26·00** *b*

REPLACEMENT PART

WD-202 **Heating element** ... ... Each **£1·20** *b*

ACCESSORY

WD-205 **Flexible tube,** 90 cm long for blowing air into large vessels ... ... Each **£1·60** *b*

WD-215

WD-215

GLASSWARE DRYER, *Gallenkamp*, 12 point, as specification. Overall height without tubes, 28 cm, diameter 35 cm, power rating 1000W. For 200/250V 50 Hz supplies ... ... Each **£52·00** *b*

REPLACEMENT PART

WD-216 **Heating element** ... ... Each **£2·40** *b*

ACCESSORY

WD-218 **Apparatus support tube,** 75 mm long × 11 mm dia. with air outlets at top and sides to fit in place of standard general purpose tubes. Ten **£7·60** Each **£0·84** *b*

When ordering please state voltage and frequency of supply.

WASTE DISPOSAL

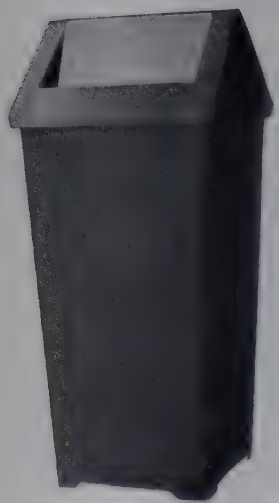
WD-400

WASTE BIN, plastics. A large capacity, hygienic receptacle fitted with a removable cover for easy emptying. The cover has a rocking flap through which waste material is admitted. Overall dimensions 70 cm high × 32 cm × 32 cm ... ... Each **£2·10** *m*

WD-425

WASTE BINS, polythene, circular, complete with lid.

Capacity, approx.	35	70	90 litres	
Diameter at top	36	47	48 cm	
Height	38	51	60 cm	
Each	**£2·00**	**2·90**	**3·00**	*c*



WD-400

WD-425

All items on this page normally available from stock.

WD-440
with sack

WD-455
with sack

WD-441
with sack

WD-450
with sack

WATCH GLASSES adjusted to a predetermined weight of 10 or 20 grammes within ±1 mg for use on analytical balances, see BA-974 in List No. sequence.

WASTE SACKS AND HOLDERS

The advantage of disposable sack refuse disposal is that when full, the sack is simply detached, closed and taken away—and a clean, fresh sack is fitted. The tough, wet-strength sacks listed are particularly easy to handle; only the weight of the contents is carried—no heavy bin. Sacks are held by strong metal holders with plastics lids which close over the tops of the fitted sacks.

WD-440

WASTE SACK HOLDER, small size. A free-standing mobile holder with lightweight pedal-operated lid. The tubular stand is finished in white stove enamel and is small enough to slide under laboratory benches. Overall dimensions (lid closed) 29×25×60 cm high. **Without sacks** ... ... Each **£3·55** *f*

WD-441

WASTE SACK HOLDER, small size as WD-440. With bracket for wall or bench-end mounting. Including lid but **without sacks** ... ... Each **£2·35** *f*

ACCESSORIES for WD-440 and WD-441

WD-442 **Waste sacks,** polythene light duty, 60 × 28 cm. Pack of 100 **£1·25** *m*

WD-444 **Waste sacks,** 1-ply kraft, 60×28 cm. Pack of 50 **£1·40** *m*

WD-450

WASTE SACK HOLDER, large size. With bracket for wall mounting. Overall dimensions 38 cm wide by 38 cm deep. Including lid but **without sacks.** Each **£3·10** *f*

WD-455

WASTE SACK HOLDER, large size as WD-450 but with free-standing mobile frame, white stove enamelled, and pedal operated lid. Overall dimensions 38×38×94 cm high. **Without sacks** ... ... Each **£4·80** *f*

ACCESSORIES for WD-450 and WD-455

WD-458 **Waste sacks,** polythene, 100×33 cm. Pack of 100 **£4·40** *m*

WD-460 **Waste sacks,** 2-ply high wet strength kraft, 100×36×20 cm ... ... Pack of 50 **£2·85** *m*

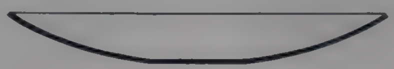
WATCH GLASSES

***WE-025**

WATCH GLASSES, thin clear glass, edges ground. Supplied in packs of 10.

Diameter	5	6·5	7·5	9 cm	
10 packs	**£4·00**	**4·80**	**5·80**	**6·60**	*c*
Pack	**£0·45**	**0·53**	**0·64**	**0·74**	

Diameter	10	12·5	15	20 cm	
10 packs	**£7·60**	**12·20**	**15·50**	**26·50**	*c*
Pack	**£0·84**	**1·35**	**1·70**	**2·95**	



WE-050

***WE-050**

WATCH GLASSES, stout clear glass, with flat polished bottom. Supplied in packs of 10.

Diameter	5	6·5 cm	
10 packs	**£8·00**	**8·20**	*c*
Packs	**£0·88**	**0·90**	

WE-060

WE-060

WATCH GLASSES, *Pyrex brand* glass.

Diameter	2·5	5	7·5	10	12·5	15 cm	
Std. pack qty.	36	36	144	144	72	72	
Std. pack	**£8·05**	**8·60**	**39·90**	**48·55**	**25·05**	**29·70**	*d*
Dozen	**£2·85**	**3·00**	**3·70**	**4·10**	**4·50**	**5·40**	
Each	**£0·30**	**0·32**	**0·37**	**0·40**	**0·44**	**0·50**	

All items on this page normally available from stock.

WATER BATHS

A range of simple, inexpensive water baths, especially suitable for educational use, manufactured of light gauge aluminium for convenience in handling and for rapid heating.

WF-020
WATER BATH, for gas heating, aluminium, 12·5 cm diameter, 9 cm deep. With two handles and set of aluminium rings ... Ten **£11·40** Each **£1·30** *c*

WF-030
WATER BATH, for gas heating, anodised aluminium, 20 cm diameter, 11·5 cm deep. With two plastics heat resisting handles and set of aluminium rings.
Ten **£31·00** Each **£3·50** *b*

WF-040
WATER BATH, as WF-030 but with constant level device fitted ... ... Ten **£35·00** Each **£3·90** *b*

ACCESSORY
WF-042 Tripod stand with positioning rim. Suitable for WF-030 and WF-040. Ten **£13·60** Each **£1·50** *b*

WF-050
WATER BATH, electrically heated, anodised aluminium, 20 cm diameter, 11·5 cm deep. The 1000W heater incorporates a device which limits its temperature to a safe low value in the event of the bath boiling dry. With constant level device, plastics heat resisting feet and set of aluminium rings. Fitted with mains cable. For 220/240V a.c. supplies only.
Ten **£76·00** Each **£8·40** *b*

REPLACEMENT PART
WF-052 Heating element, 1000W, with plug and mains cable.
Each **£2·70** *b*

WF-020

WF-040 with WF-042

WF-050

Gallenkamp SINGLE PLACE WATER OR STEAM BATHS
WITH BUILT-IN ELECTRIC HEATING

For safe, reliable long term digestion, evaporation, etc.

WF-150
WATER BATH, *Gallenkamp*, cast aluminium alloy, grey stoved enamel finish exterior. Dimensions: internal **20 cm diameter**×14·5 cm deep. With built-in 750W electric heater, constant level device and a set of stainless steel rings WF-290. The heater incorporates a device which limits its temperature to a safe, low value in the event of the bath boiling dry. Fitted with mains cable. For 220/240V a.c. supplies only ... ... Each **£16·50** *b*

REPLACEMENT PART
WF-152 Heating element, 750W, with plug and mains cable.
Each **£3·20**

When ordering please state voltage and frequency of supply.

WF-150

WF-190
WATER BATH, *Gallenkamp*, tinned spun copper, grey stoved enamel finish exterior. Dimensions: internal **25 cm diameter**×13 cm deep; overall height, 18 cm. With three legs, built-in 1500W electric heater, constant level device and set of concentric copper rings. The heater incorporates a device which limits its temperature to a safe, low value in the event of the bath boiling dry. Fitted with mains cable. For 220/240V a.c. supplies only.
Each **£19·50** *b*

REPLACEMENT PART
WF-194 Heating element, 1500W, with plug and mains cable.
Each **£2·80** *b*

When ordering please state voltage and frequency of supply.

WF-190

All items on this page normally available from stock.

Gallenkamp MULTIPLE PLACE WATER/STEAM BATHS

WITH BUILT-IN ELECTRIC HEATING

For performing replicate digestions or evaporations safely over long periods.

WF-200

Power controllers for adjustment of boiling rate—see EC-750 et seq. in List No. sequence.

WF-220
(WF-250 is similar in design)

Gallenkamp

WATER BATHS FOR SOXHLET EXTRACTION

- Six place for flasks up to 500 ml capacity
- Energy regulator control
- Built-in constant level

For full details and prices see EV-100 in List No. sequence.

WF-200

WATER BATH, *Gallenkamp,* **5-hole,** size 27×20×10 cm, with 750W electric heater and constant level device. The bath is an aluminium alloy casting finished in grey stoved enamel. The stainless steel cover has circular holes 10·1, 8·5, 6·9 cm and (two) 5·3 cm diameter each fitted with a set of stainless steel rings. The heater incorporates a thermostat device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies	... ...	Each	**£18·00**	*b*
For 200/210V a.c. supplies	... ...	Each	**£18·00**	*bN*
For 110/120V a.c. supplies	... ...	Each	**£18·00**	*bN*

When ordering please state voltage.

REPLACEMENT PARTS

WF-152	**Heating element** ...	For details and prices see entries in List No. sequence.
WF-290	**Water bath rings** ...	

WF-220

WATER BATH, *Gallenkamp,* **stainless steel, 6-hole,** size 33×23×10 cm, with 750W electric heater and constant level device. The removable cover has 8·5 cm diameter holes, each fitted with a set of stainless steel rings. The heater incorporates a thermostat device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies	... ...	Each	**£23·00**	*b*
For 200/210V a.c. supplies	... ...	Each	**£23·00**	*bN*
For 110/120V a.c. supplies	... ...	Each	**£23·00**	*bN*

When ordering please state voltage.

REPLACEMENT PARTS

WF-152	**Heating element** ...	For details and prices see entries in List No. sequence.
WF-290	**Water bath rings** ...	

WF-250

WATER BATH, *Gallenkamp,* **stainless steel, 12-hole,** size 46×30×10 cm, with 1500W electric heater and constant level device. The removable cover has 8·5 cm diameter holes each fitted with a set of stainless steel rings. The heater incorporates a thermostat device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies	... ...	Each	**£30·00**	*b*
For 200/210V a.c. supplies	... ...	Each	**£30·00**	*bN*
For 110/120V a.c. supplies	... ...	Each	**£30·00**	*bN*

When ordering please state voltage.

REPLACEMENT PART

WF-252	**Heating element, 1500W**	... ...	Each	£3·00	*b*

When ordering please state voltage.

REPLACEMENT RINGS FOR WF-200, WF-220 and WF-250.

WF-290 **Water bath rings,** *Gallenkamp,* **stainless steel; size 1 is the central cover with a knob.**

Size	1	2	3	4	
Ext. dia.	5·1	6·6	8·2	9·9 cm	
Int. dia.	—	3·8	5·3	6·9 cm	
Each	£0·15	0·17	0·20	0·25	b
Size	5	6	7	8	
Ext. dia.	11·5	13·3	15·1	17·1 cm	
Int. dia.	8·5	10·1	11·9	13·1 cm	
Each	£0·30	0·35	0·45	0·50	b

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL PURPOSE WATER BATH

10 LITRE CAPACITY WITH *Compenstat* CONTROL

For all applications requiring a compact reliable bath with close temperature control.

- **Stainless steel interior**
- **Compact design**
- **All metal construction**
- **Excellent performance**

PERFORMANCE AND CONTROLS

Temperature range	Ambient temperature +5degC to 100°C.
Temperature fluctuation	0·4degC (with water) 0·8degC (with oil)
Temperature variation	Less than 0·1degC.

NOTES: 1. For use above 50°C with water, the gabled cover should be fitted to minimise evaporation.

2. For use at or below ambient temperature, the cooling coil and a supply of cold water are necessary.

The controls comprise a mains on/off switch, load indicator lamp and a *Compenstat* direct reading thermostat scaled 0–100°C in 5° subdivisions. The bath liquid is vigorously stirred by an efficient propeller which is driven by a quiet induction motor.

CONSTRUCTION AND DIMENSIONS

The bath is of stainless steel; the outer case is sheet steel finished in grey stoved enamel. Between them is packed glass fibre insulation. All the controls are mounted in a stainless steel case which bridges one end of the bath. A false bottom ensures efficient water circulation with all bath loads. The immersion heater is metal sheathed.

Dimensions

	H	W	D	
Working space	14	× 38	× 21	cm
	5½	× 15	× 8	in
Overall	28	× 50	× 24	cm
	11	× 19½	× 9½	in
Power rating, maximum		1500W		

Accommodates three accessory racks WF-385 to WF-393.

WF-360
WATER BATH, *Gallenkamp*, **10 litre capacity, stainless steel,** as specification, *Compenstat* controlled for 100°C max. With induction motor-stirrer. For single phase a.c. supplies only. **Without accessories.**

For 220/240V	Each	**£48·50**	*b*
For 200/210V	Each	**£49·00**	*bN*
For 110/120V	Each	**£49·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

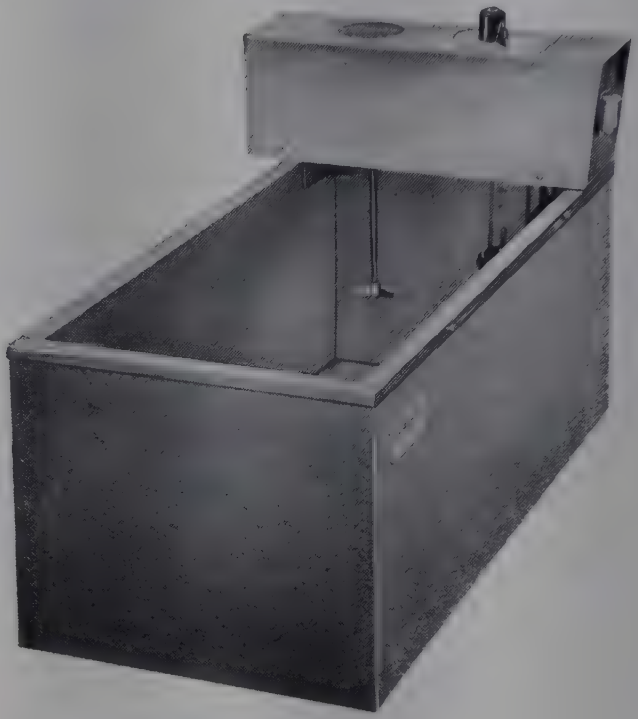
WF-363	Stirrer motor	Each	**£2·60**	*c*
WF-365	Heating element, 1500W	Each	**£4·40**	*b*

When ordering replacement parts please state serial number of water bath and supply voltage.

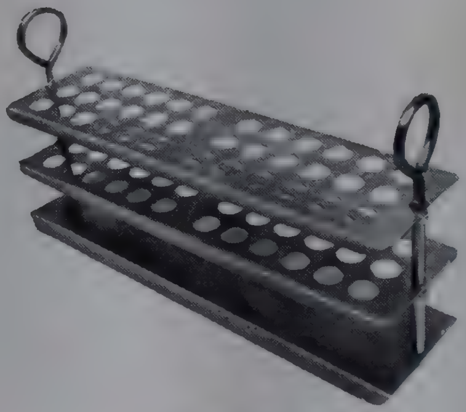
ACCESSORIES FOR WATER BATH WF-360

WF-371	**Cooling coil,** for clipping to the side of the bath, with connections for 8–9 mm bore flexible tubing.	Each	**£6·80**	*b*
WF-373	**Cover, stainless steel, gabled,** to drain condensation to the sides of the bath	Each	**£6·00**	*b*
WF-374	**Thermometer holder,** for clipping over side of bath.	Each	**£0·80**	*b*
WF-376	**Pump,** for circulating water to external apparatus. Maximum head 60 cm at zero flow, maximum output 4 litres/min at zero head. With outlet nozzles suitable for 10–12 mm bore flexible tubing. Only suitable for use with WF-360	Each	**£1·40**	*b*

For larger capacity circulating pump see Water Pumps.



WF-360



WF-391

WF-380	**Spheres, polyolefin,** 20 mm dia. For use in water baths as a floating lid to minimise evaporation and heat losses. 200 spheres cover approximately 600 cm² and weigh approximately 150 g. In pack of 200 ...	Pack	**£1·75**	*m*

NOTE: 2 packs required to cover WF-360 with a single layer.

STAINLESS STEEL RACKS

Racks WF-385, WF-387, WF-389 and WF-391 are supplied as packs of separate components for assembly by the user. Spacers are provided which allow the top plate to be set at heights of 40 mm, 60 mm or 80 mm above the base plate.

Rack WF-393 is supplied factory assembled.

Overall dimensions of all racks when assembled 27×7×13 cm high.

WF-385	**Rack,** stainless steel, to hold sixteen 25 mm dia. tubes.	Each	**£3·20**	*b*
WF-387	**Rack,** stainless steel, to hold eighteen 19 mm dia. tubes.	Each	**£3·20**	*b*
WF-389	**Rack,** stainless steel, to hold twenty-six 16 mm dia. tubes.	Each	**£3·20**	*b*
WF-391	**Rack,** stainless steel, to hold thirty-six 12 mm dia. tubes.	Each	**£3·20**	*b*
WF-393	**Rack,** stainless steel, to hold thirty-six 12 mm dia. tubes. With shelf which can be raised or lowered to allow immersion depth of tubes to be varied. Distance between top plate and shelf is 6 cm max., 3·5 cm min.	Each	**£5·60**	*b*

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL

For laboratory applications in which constant temperature and rapid heat transference to samples is required. Applications include long term static incubations, sample conditioning, water absorption and solubility tests, chemical kinetics investigation etc.

PERFORMANCE AND CONTROLS

Temperature range	Ambient +5degC to 100°C
Temperature fluctuation	0·3degC max. (with water)
Temperature variation	0·2degC throughout whole working volume

NOTES:
1. For use above 50°C with water, the gabled cover should be fitted to minimise evaporation.
2. For use at or below ambient temperatures, the cooling coil and a supply of cold water are necessary.

The controls are grouped in a compartment at one end of the bath and include the mains ON/OFF switch, load indicator lamp and the *Compenstat* (solid state) direct reading thermostat, scaled 0–100°C in 5degC subdivisions.

General Purpose WATER BATH 15 litre capacity

WF-400 with IH-360

NOTE: WF-400 can be converted to a metabolic shaking incubator IH-350 after purchase. Quotation for set of additional parts and fitting instructions on request.

WATER BATHS WITH SHAKER PLATFORMS

Water baths with shaker platforms for the continuous agitation of bottles, flasks or tubes are listed under **INCUBATORS**. The complete range of *Gallenkamp* incubators also includes gravity and mechanically convected air models for operation above or below ambient temperature. For details see pages 402 to 411.

WF-400

WATER BATH, *Gallenkamp*, **15 litre capacity, stainless steel,** as specification, *Compenstat* (solid state) controlled, for 100°C max. For single phase a.c. supplies only.

Without accessories

For 220/240V	Each	**£62·00**	*b*
For 200/210V	Each	**£62·00**	*bN*
For 110/120V	Each	**£62·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

WF-402	**Heater, 500W**	Each	**£3·80**	*b*

When ordering replacement part please state serial number of water bath and supply voltage.

ACCESSORIES

IH-360	**Cover,** stainless steel, gabled to drain condensation to sides of bath. For price see entry in List No. sequence.			
WF-404	**Cooling coil,** to clip over side of bath. With connections for 8 mm bore flexible tubing	Each	**£9·50**	*b*
WF-406	**Thermometer holder,** stainless steel, clipping on side of bath	Each	**£0·80**	*b*
WF-408	**Shelf, adjustable**	Each	**£7·25**	*b*
TJ-440	**Thermometer,** scale span 0 to 110°C.	For prices see entries in List No. sequence.		
WF-380	**Spheres,** to minimise evaporation and heat losses. 2 packs required ...			

STAINLESS STEEL RACKS

WF-385	**Rack,** to hold 25 mm dia. tubes ...	For details and prices see entries in List No. sequence.
WF-387	**Rack,** to hold 19 mm dia. tubes ...	
WF-389	**Rack,** to hold 16 mm dia. tubes ...	
WF-391	**Rack,** to hold 12 mm dia. tubes ...	
WF-393	**Rack,** to hold 12 mm dia. tubes, with adjustable shelf	

Items on this page normally available from stock except those coded *N*.

PURPOSE WATER BATHS

- **Accurate temperature control by *Compenstat* (solid state)**
- **Stainless steel interiors**
- **Optional accessories including covers, shelves, cooling coils and tube racks**

CONSTRUCTION AND DIMENSIONS

The interspace between the stainless steel interior and the grey stoved enamel finished outer case is filled with high efficiency fibre glass insulation. The heaters, which are metal sheathed, are mounted outside the working space just under the floor of WF-400 and inside the working space just above the floor of WF-455.

	WF-400	WF-455
	H W D	H W D
Overall dimensions	22 × 50 × 40 8½ × 19½ × 15½	27 × 64 × 41 cm 10½ × 25 × 16 in
Internal dimensions	16 × 35 × 30 6½ × 14 × 12	20 × 43 × 30 cm 8 × 17 × 12 in
Heater rating	500W	1500W
Number of racks accommodated (see WF-385 to WF-393)	5	6

General Purpose WATER BATH 30 litre capacity

WF-455

WATER BATH, *Gallenkamp*, **30 litre capacity, stainless steel,** as specification. *Compenstat* (solid state) controlled, for 100°C max. For single phase a.c. supplies only. Supplied with perforated shelf, the height of which can be adjusted in 2·5 cm steps. **Without cover or other accessories.**

For 220/240V	Each	**£89·00**	*b*
For 200/210V	Each	**£94·00**	*bN*
For 110/120V	Each	**£94·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

WF-456	**Heater,** 1500W	Each	**£4·30**	*b*

When ordering replacement parts please state serial number of water bath and supply voltage.

WF-455 with WF-458 and WF-460

ACCESSORIES

WF-458	**Cover,** stainless steel, gabled to drain condensation to sides of bath, with handle and tubulure for insertion of thermometer	Each	**£11·50**	*b*
WF-459	**Cooling coil,** fixing to side of bath. With connections for 8–9 mm bore flexible tubing ...	Each	**£9·00**	*b*
WF-460	**Constant level device**	Each	**£4·90**	*b*
TJ-440	**Thermometer,** scale span 0 to 110°C.	For prices see entries in List No. sequence.		
WF-380	**Spheres,** to minimise evaporation and heat losses. 3 packs required ...			

STAINLESS STEEL RACKS

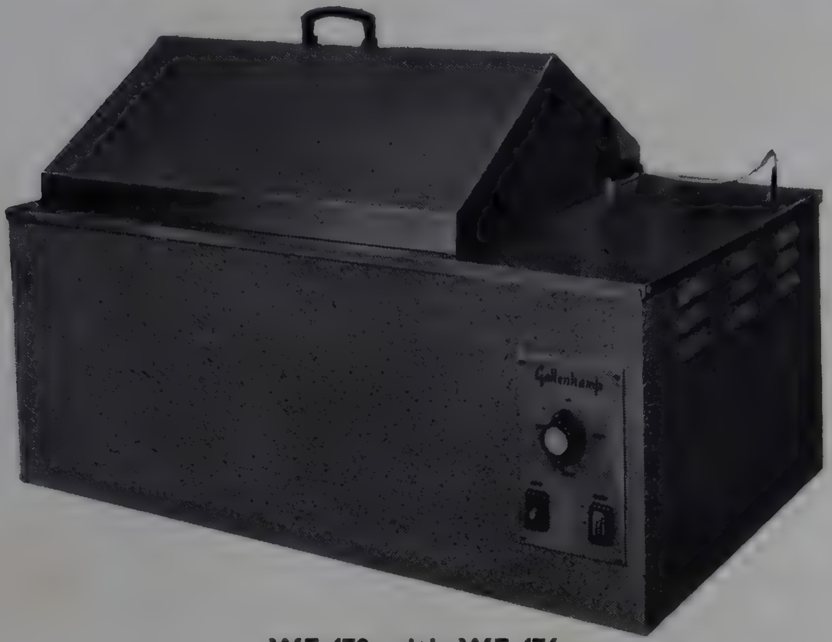
WF-385	**Rack,** to hold 25 mm dia. tubes ..	For details and prices see entries in List No. sequence.
WF-387	**Rack,** to hold 19 mm dia. tubes ...	
WF-389	**Rack,** to hold 16 mm dia. tubes ...	
WF-391	**Rack,** to hold 12 mm dia. tubes	
WF-393	**Rack,** to hold 12 mm dia. tubes, with adjustable shelf	

Items on this page normally available from stock except those coded *N*.

Gallenkamp GENERAL PURPOSE WATER BATH

70 LITRE CAPACITY

For laboratory applications in which constant temperature and rapid heat transference to samples are required.



WF-470 with WF-476

- **Temperature control by contact thermometer**
- **Stainless steel interior**
- **Accessories include cover, cooling coil and tube racks**

PERFORMANCE AND CONTROLS

Temperature range	ambient +5degC to 95°C (with cover)
Temperature fluctuation	±0·1degC (with water)
Temperature variation	0·2degC

NOTES:

1. For use above 50°C with water the gabled cover should be used to minimise evaporation.
2. For use at or below ambient temperatures the cooling coil and a supply of cold water are necessary.

The 0–100°C contact thermometer mounted in its protective housing, the tubulure for an indicating thermometer and the control compartment for the transistorised relay are grouped at one end of the bath. A three heat switch with OFF position and mains and load indicator lamps are fitted. The three heat switch enables the power input to the bath to be set to 500, 1000 or 2000 watts to provide rapid heating and optimum control at the set temperature.

CONSTRUCTION AND DIMENSIONS

The interspace between the stainless steel interior and the grey stoved enamel finished outer case is filled with high efficiency fibre glass insulation. Two metal sheathed heaters are mounted just above the floor of the bath. A perforated stainless steel shelf is fitted, the height of which can be adjusted in 2·5 cm steps to give working depths of between 24 and 9 cm measured from the top of the bath wall.

	H	W	D
Overall dimensions	33 ×	84 ×	56 cm
	13 ×	33 ×	22 in
Internal dimensions	25 ×	53 ×	43 cm
	10 ×	21 ×	17 in
Heater rating		2000 W	
Number of accessory racks accommodated		12	

WF-470

WATER BATH, *Gallenkamp*, **70 litre capacity, stainless steel,** as specification, temperature controlled by contact thermometer up to 95°C max. With adjustable shelf but **without accessories.** For single phase a.c. supplies only.

For 220/240V	Each	**£118·00**	*b*
For 200/210V	Each	**£118·50**	*bN*
For 110/120V	Each	**£118·50**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-472	**Heater,** 1000W, inner	Each	**£5·40**	*b*
WF-474	**Heater,** 1000W, outer	Each	**£6·20**	*b*
TM-866	**Contact thermometer,** 0–100°C. For prices see entry in List No. sequence.			

When ordering replacement parts please state serial number of water bath and supply voltage.

ACCESSORIES

WF-476	**Cover, gabled,** stainless steel	Each	**£18·50**	*b*
WF-460	**Constant level device**	For details and prices see entries in List No. sequence.		
IH-392	**Cooling coil**			
TJ-440	**Thermometer,** 0 to 110°C			
WF-380	**Spheres,** to minimise evaporation and heat losses. 5 packs required ...			

STAINLESS STEEL RACKS

WF-385	**Rack,** to hold 25 mm dia. tubes ...	For details and prices see entries in List No. sequence.
WF-387	**Rack,** to hold 19 mm dia. tubes ...	
WF-389	**Rack,** to hold 16 mm dia. tubes ...	
WF-391	**Rack,** to hold 12 mm dia. tubes ...	
WF-393	**Rack,** to hold 12 mm dia. tubes, with adjustable shelf	

Items on this page normally available from stock except those coded *N*.

Gallenkamp REFRIGERATED THERMOSTATIC BATH

35 LITRE CAPACITY

with contact thermometer control

For reliable long term operation at any temperature between −20°C and 50°C. Particularly suitable for maturing jelly samples at 10°C to BS 647 and BS 757.

- **Large capacity interior of stainless steel**
- **Adjustable shelf**
- **Quiet in operation**
- **Efficient insulation**
- **Alternative version with external circulating pump**

Gallenkamp

WF-720

PERFORMANCE AND OPERATION

Temperature range (in ambient of 25°C)	−20°C to 50°C (see Note below).
Temperature fluctuation	±0·5degC

Temperature is controlled by a contact thermometer which actuates a transistorised relay in the heater supply circuit. Below ambient temperature, the refrigerator is operated continuously. The bath liquid (which can be water, aqueous ethylene glycol or light oil, depending on operating temperature) is vigorously and noiselessly stirred by an induction motor driven high efficiency propeller.

CONSTRUCTION

The apparatus comprises an upper section containing the bath and controls, supported on a plinth which houses the refrigerator. This outer case is finished in grey stoved enamel and is mounted on smoothly running castors. The interspace between the outer case and the bath is filled with rigid polyurethane foam insulation and is vapour sealed. Across one end of the bath is a bridge which houses the electrical controls and supports the heater, cooling coil, stirrer and contact thermometer. The bath is fitted with a hinged, easily raised lid and a perforated stainless steel shelf whose height can be adjusted to suit the work load.

DIMENSIONS

	H W D
External, excluding contact thermometer	86 × 69 × 61 cm 34 × 27 × 24 in
Internal working space	23 × 43 × 36 cm 9 × 17 × 14 in
Net weight, approx.	65 kg (140 lb)
Power rating, max.	850W

WF-720

COOLED THERMOSTATIC BATH, *Gallenkamp,* **35 litre capacity,** as specification, with refrigerator, transistorised relay, contact thermometer, stirrer and motor, adjustable shelf and hinged cover. For single phase a.c. supplies only.

For 220/240V	Each	**£286·00**	*b*
For 200/210V	Each	**£296·00**	*bN*
For 110/120V	Each	**£296·00**	*bN*

When ordering please state voltage and frequency of supply.

WF-721

COOLED THERMOSTATIC BATH, *Gallenkamp,* **35 litre capacity,** as WF-720 but **with built-in pump** to circulate bath fluid to external apparatus at rates between 11·5 l/min at zero head and 2 l/min at 160 cm head. For single phase a.c. supplies only.

For 220/240V	Each	**£338·00**	*b*
For 200/210V	Each	**£348·00**	*bN*
For 110/120V	Each	**£348·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-724	**Heating element**	Each	£3·50	b
WF-725	**Stirrer motor**	Each	£4·70	c
WF-726	**Contact thermometer, range** −38°C to +50°C.	Each	£7·50	c

When ordering replacement parts please state serial number of bath and supply voltage.

ACCESSORY

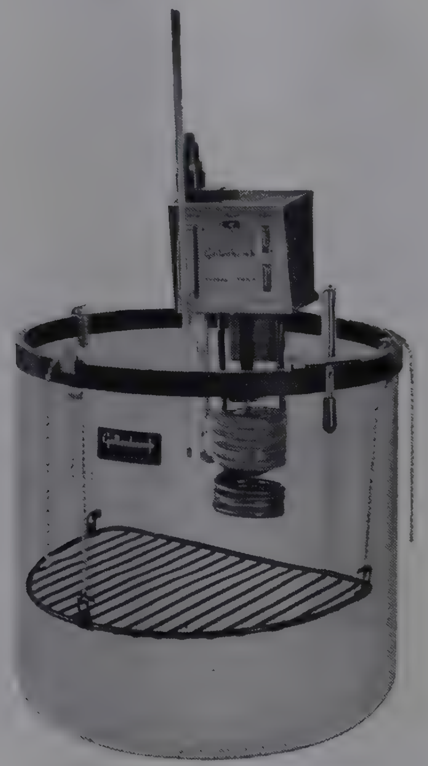
LX-110 **Lubricant,** for fan motor bearings. For price see entry in List No. sequence.

Items on this page normally available from stock except those coded *N.*

Gallenkamp THERMOSTATIC WATER BATH

20 LITRE CAPACITY

For general purposes where precise temperatures must be maintained over long periods of time. Also suitable for many standard test methods including IP 49, IP 59, IP 60, IP 160, IP 189 and IP 190.



WF-850 with accessories

- **Good visibility—all glass tank**
- **Control by Thermo Stirrer with contact thermometer and solid state switching**
- **Vigorous agitation without vortexing**
- **Accessories include adjustable shelf, laboratory scaffold rod fixings, equipment for viscometry and an inexpensive circulating pump**

PERFORMANCE AND DESCRIPTION

Temperature range	ambient to 90°C
Temperature fluctuation	±0·05degC
Temperature variation	0·1degC

This water bath is an assembly comprising:

WF-855

Borosilicate glass tank with rubber covered rim.

TM-860

Thermo Stirrer with 0–100°C contact thermometer and solid state switching, 3-power heater and motor driven stirrer.

DIMENSIONS

Tank, internal	34 cm dia. × 30 cm high
Tank with Thermo Stirrer and contact thermometer fitted, overall	H W D 50 × 42 × 43 cm

WF-850

WATER BATH, 20 litre capacity, *Gallenkamp,* as specification comprising WF-855 glass tank and TM-860 Thermo Stirrer with contact thermometer 0–100°C, 3-power heater and motor driven stirrer. For single phase supplies.

For 220/240V 50 Hz	Each	**£52·00**	*b*
For 200/210V 50 Hz	Each	**£52·00**	*bN*
For 110/120V 60 Hz	Each	**£52·00**	*bN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-855	Tank, borosilicate glass with rubber covered rim.	Each **£10·00**	*m*
TM-864	**Heating element, 1000W**	For details and prices see entries in List No. sequence.	
TM-866	**Contact thermometer,** range 0 to 100°C		
WF-363	**Stirrer motor**		

When ordering replacement parts please state serial number o Thermo Stirrer and supply voltage.

ACCESSORIES

WF-860	**Wire shelf, plastics coated,** adjustable, including three ball chains and fittings	Each **£7·40**	*b*
WF-864	**Support rod,** 5 cm × 12·7 mm dia., with clamp to fit rim of bath...	Each **£1·90**	*b*
WF-866	**Support plate,** with three 2 in diameter holes to accommodate viscometer holders VS-630 to VS-634. **Requires two support rods WF-864 for mounting.**	Each **£6·80**	
TM-844	**Retort rod mount** ...	For details and prices see entries in List No. sequence.	
TM-870	**Cooling coil**...		
TM-872	**Holder,** for mercury in glass thermometer		
TM-874	**Heater, 1500W**		

When ordering please state serial number of Thermo Stirrer and supply voltage.

WF-376	**Pump,** for circulating water to external apparatus ...	For details and prices see entries in List No. sequence.
WF-380	**Spheres,** to minimise evaporation and heat losses. 2 packs required	
TJ-102	**Thermometer,** to BS 1704, GP 105C/0·5/100, suitable for measuring the water bath temperature	
VS-630	**Viscometer holder** ...	
VS-632	**Viscometer holder** ...	
VS-633	**Viscometer holder** ...	
VS-634	**Viscometer holder** ...	

Items on this page normally available from stock except those coded *N*.

Gallenkamp WATER DETERMINATION APPARATUS

TO IP 74 and BS 756
For determination of water content by Dean and Stark method

WJ-130
CONDENSER, Ⓐ, **borosilicate glass,** to BS 756 Fig. 3 and IP 74, jacket length 400 mm, with 19/26 cone.
Ten **£13·20** Each **£1·45** *a*

WJ-135
SPRAY TUBE, Ⓐ, to BS 756 Fig. 4.
Ten **£3·40** Each **£0·40** *a*

BOROSILICATE GLASS RECEIVERS

WJ-150
RECEIVER, *Technico,* **Type I,** to BS 756 Fig. 5, capacity 2 cm³ subdivided in 0·05 cm³. With 24/29 cone and 19/26 socket ... ... Dozen **£25·00** Each **£2·35** *a*

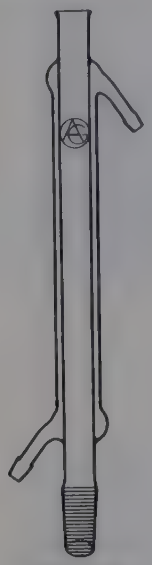
WJ-160
RECEIVER, *Technico,* **Type I,** to BS 756 Fig. 6, capacity 7·5 cm³ subdivided in 0·1 cm³. With 24/29 cone and 19/26 socket ... Dozen **£26·00** Each **£2·45** *a*

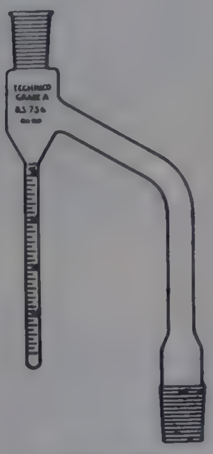
WJ-170
RECEIVER, *Technico,* **Type I,** to BS 756 Fig. 7, capacity 10 cm³ subdivided in 0·1 cm³. With oblique bore stopcock, 24/29 cone and 19/26 socket.
Dozen **£35·00** Each **£3·30** *a*

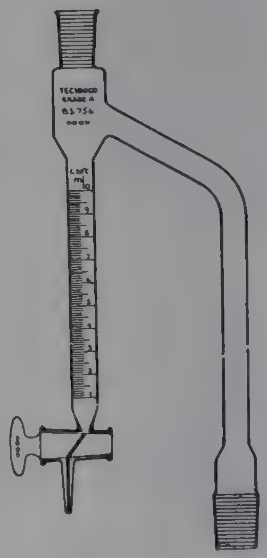
WJ-175
RECEIVER, *Technico,* to ASTM D95, capacity 10 cm³ subdivided in 0·1 cm³ to 1 cm³ and 0·2 cm³ from 1 to 10 cm³. With 24/29 cone and 19/26 socket.
Dozen **£37·00** Each **£3·50** *a*

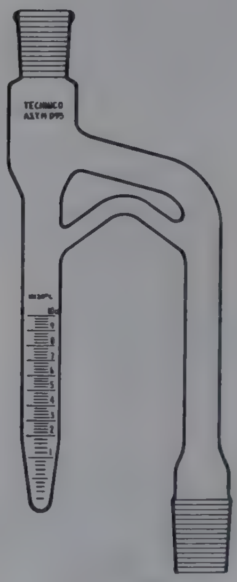
WJ-180
RECEIVER, *Technico,* **Type I,** to BS 756 Fig. 8, capacity 25 cm³ subdivided in 0·2 cm³. With 24/29 cone and 19/26 socket ... ... Dozen **£35·00** Each **£3·30** *a*

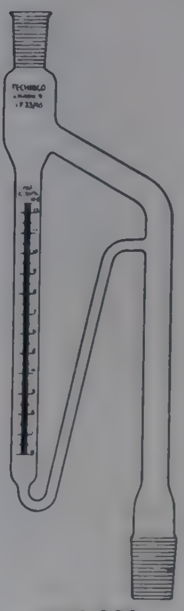
WJ-230
RECEIVER, *Technico,* **Type 2,** to BS 756 Fig. 12, capacity 12·5 cm³ subdivided in 0·1 cm³. With 24/29 cone and 19/26 socket ... Dozen **£33·00** Each **£3·10** *a*


WJ-130


WJ-150
(WJ-160 and WJ-180 are similar)


WJ-170


WJ-175


WJ-230

ACCESSORIES FOR DEAN AND STARK APPARATUS

DISTILLATION FLASK	see Q-FR 500/3S under QUICKFIT
FLASK HEATER, gas	see BX-020 et seq.
or	
FLASK HEATER, electric	see HD-500 and HD-505
RETORT STANDS AND CLAMPS	see SM-430 to SM-610
TUBING	see TX-520, N6·5

For details and prices see entries in List No. sequence.

OTHER APPARATUS FOR THE DETERMINATION OF WATER CONTENT

DRYING OVENS, *Gallenkamp*	see OV-010 et seq.
HYGROMETERS	see HV-100 et seq.
INFRARED BALANCE	see MV-660
KARL FISCHER APPARATUS	see EJ-960 and EJ-980
MOISTURE EXTRACTION OVEN, *Gallenkamp*	see OV-440 and OV-445
VACUUM OVENS, *Gallenkamp*	see MV-600 and OV-930

For details and prices see entries in List No. sequence.

All items on this page normally available from stock.

WATER HEATERS

WK-620

WK-620

WATER HEATER, gas, *Ascot*, **continuous flow, single point.** Fitted with hot and cold taps and gas and water governors.

Temperature selector provides for outputs of approximately 3 litres/min at 50°C or 2 litres/min at 65°C. White vitreous enamel finished with chromium plated bottom cover and 23 cm swivel outlet. Dimensions 59 × 23 × 20 cm deep ... ... Each **£26·65** *m*

WK-640

WATER HEATER, gas, *Ascot*, **continuous flow, multi-point,** intended to serve several hot water taps. Fitted with gas and water governors, gas control and draught diverter.

Temperature selector provides for outputs of approximately 17 litres/min at 30°C, 10 litres/min at 50°C or 7 litres/min at 65°C. White vitreous enamel finished. Dimensions 102 × 38 × 23 cm deep ... Each **£50·00** *m*

WK-670

WK-670

WATER HEATER, electric, *GEC*, **storage pattern,** Suitable for under bench fitting and intended to serve one or more taps. The 3 kW heater and thermostat provide for rapid heating of water to temperatures adjustable between 40 and 80°C. The 9 litres capacity storage tank is of tinned copper, fibreglass lagged and enclosed in white stove enamelled steel case. Dimensions 25 × 51 × 25 cm deep. For 200/250V a.c. supplies ... Each **£15·85** *f*

WK-760

WK-760

WATER HEATER, electric, *Sadia*, **storage pattern, single point.** Fitted with control valve and 30 cm swivel outlet. With 1 kW heater, thermostat and lagged 22 litres capacity tinned copper tank. Intended to supply water at 70°C. In white stove enamelled case. Dimensions 66 × 33 cm dia. For 200/250V a.c. ... Each **£36·65** *f*

When ordering electric water heaters please state voltage and frequency of supply.

WATER TREATMENT

DEIONISER, flow rates 15 to 120 litres/hour
see DH-604 to DH-735

STILLS, outputs 1 to 36 litres/hour
see DT-584 to DT-624

For full details and prices see entries in List No. sequence.

WATER PUMPS

BENCH MOUNTING

WM-050

PUMP, water, centrifugal, driven by a series wound motor. Suitable for pumping water at temperatures between 0 and 90°C. With nylon filled bakelite pump body, impeller and tubulures, neoprene seal and stainless steel driving shaft.

Flow at zero head	22 litres/min
Flow at 200 cm head	18 litres/min
Maximum head	600 cm
Tubulures	inlet and outlet 12·5 mm o.d.
Motor rating	up to 4 hours continuous running
Overall dimensions	21 × 9 × 12 cm high

For 220/240V 50/60 Hz single phase supplies.

Complete with terminal box and length of 3-core cable. Pump must be primed before use ... Each **£13·50** *m*

WM-050

WM-054

PUMP, water, centrifugal, construction and performance as WM-050 but fitted with an adjustable rheostat to control flow rate and mounted in a splashproof steel carrying case. Overall dimensions 30 × 14 × 17 cm high.

For 220/240V 50/60 Hz single phase supplies.

Complete with terminal box and length of 3-core cable. Pump must be primed before use ... Each **£25·00** *m*

WM-054

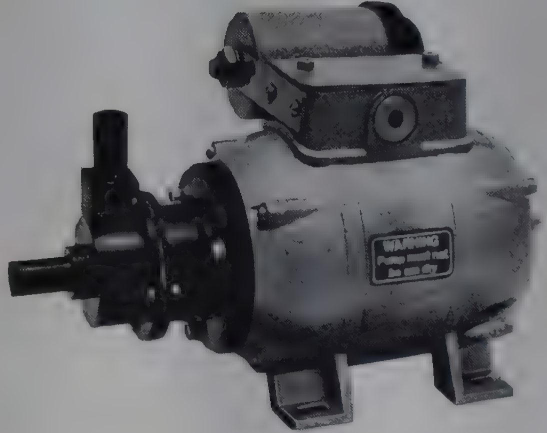
WM-080

PUMP, water, centrifugal, driven by a constant speed permanent capacitor motor. Suitable for pumping water at temperatures between 0 and 90°C. With nylon filled bakelite pump body, impeller and tubulures, neoprene seal and stainless steel driving shaft.

Flow at zero head	11 litres/min
Flow at 150 cm head	2 litres/min
Maximum head	170 cm
Tubulures	inlet and outlet 12·5 mm o.d.
Motor rating	continuous
Overall dimensions	21 × 11 × 12 cm high

For 220/240V 50 Hz single phase supplies.

Complete with fitted capacitor, terminal box and length of 3-core cable. Pump must be primed before use. Each **£14·00** *m*



WM-080

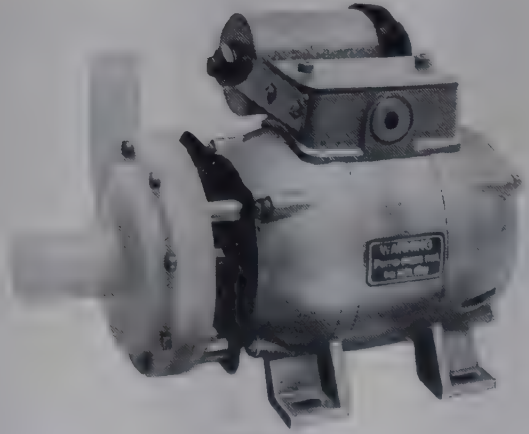
WM-084

PUMP, water, centrifugal, similar to WM-080 but with polypropylene body, impeller and tubulures and acrylonitrile seal.

Flow at zero head	23 litres/min
Flow at 200 cm head	15 litres/min
Maximum head	500 cm
Tubulures	inlet 25 mm o.d. outlet 19 mm o.d.
Motor rating	continuous
Overall dimensions	21 × 11 × 12 cm high

For 220/240V 50 Hz single phase supplies.

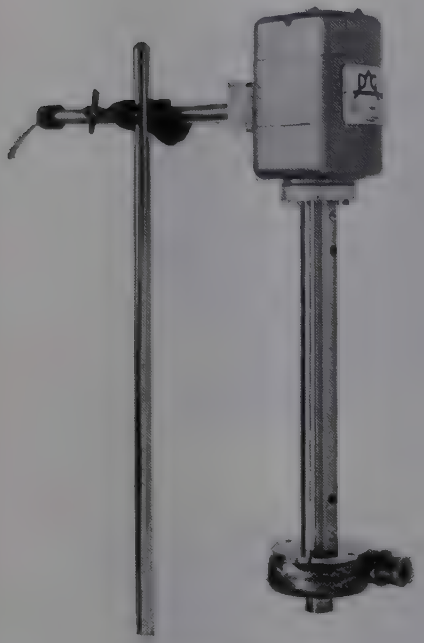
Complete with fitted capacitor, terminal box and length of 3-core cable. Pump must be primed before use. Each **£18·00** *m*



WM-084

All items on this page normally available from stock.

WATER AND CHEMICAL PUMPS


WM-165
(WM-170 is similar)

WM-175

IMMERSION

WM-165

PUMP, water and chemical, centrifugal immersion, driven by a series wound motor. Immersed parts fabricated from stainless steel and ptfe. Suitable for pumping a wide range of corrosive materials and solvents, at temperatures between 20 and 120°C. Can be dismantled for cleaning.

Water flow, zero head	22 litres/min
Water flow, 200 cm head	15 litres/min
Maximum head	500 cm water
Immersion depth	24 cm
Pump head diameter	10·5 cm
Outlet diameter	2 cm
Motor rating	up to 4 hours continuous running

For 220/240V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£33·00** *m*

WM-170

PUMP, water and chemical, centrifugal immersion, construction, pump head and outlet diameters as WM-165 but driven by an induction motor.

Water flow, zero head	25 litres/min
Water flow, 200 cm head	10 litres/min
Maximum head	300 cm water
Immersion depth	28 cm
Motor rating	continuous

For 200/250V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£39·00** *m*

WM-175

PUMP, water and chemical, centrifugal immersion, construction and performance similar to WM-170 but designed to pump liquified gases at temperatures down to −150°C. A heat break in the shaft minimises heat transfer between pump and motor. For 200/250V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£69·00** *m*

CARBOY PUMPS AND SYPHONS

- **Plastics construction**
- **Flow rates 4 to 7 litres/min**

For details and prices see CC-932 to CC-945 in List No. sequence.

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories. Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately heavy cost of handling low value and small quantity orders, however, remains a matter of concern.

We recognise that a proportion of such orders is inevitable in our business and that administrative and handling costs cannot be mitigated, as in some other spheres of distribution, by methods such as self-service.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

All items on this page normally available from stock.

PERISTALTIC WATER AND CHEMICAL PUMPS

GENERAL PURPOSE

***WM-200**

PUMP, water and chemical, peristaltic two roller self priming pattern. For use with flexible tubings, maximum o.d. 13 mm, wall thickness at least 1·5 mm. Maximum speed of rotation 500 rev/min. A water flow rate of 4 l/min at 300 cm head can be achieved using tubing TX-805 8 mm and rotational speed of 350 rev/min. With detachable foot for bench mounting, 12 mm dia. rod for bosshead mounting, and two pulleys 6 cm and 15 cm dia. for fitting to pump spindle. Without motor drive, motor pulley, V-belt or flexible tubing.

Each **£13·20** *f*

ACCESSORIES

WM-202	**V-belt,** 60 cm circumference	Each	**£0·45**	cS
SS-540	**Multispeed motor,** 10-step ...	For details and prices see entries in List No. sequence.		
MX-720	**Pulley,** size 1 to fit SS-540 shaft ...			
TX-520	**Tubing,** rubber, N8			
TX-805	**Tubing,** silicone rubber, 8 mm ...			

PRECISE METERING

For pumping, dosing and metering a wide range of fluids including sterile and corrosive ones. The standard pumps WM-250 and WM-260 use an elastic tube clipped to a curved track which is mounted concentrically with a rotor having three rollers. Rotation of the rollers flattens the tube against the track and these flats move the contents along the tube by positive displacement. As the tube recovers, the suction created draws more fluid into the tube.

The multichannel accessories WM-290 and WM-295 have △ section rotors round which the tube elements are wrapped so as to kink at 3 points of small radius. The rotor action within the loop of tubing moves the kinks along to provide positive displacement of the contents.

WM-250

PUMP, water and chemical, peristaltic metering, *Watson-Marlow* **Model MHRE/200.** A single channel pump accepting flexible tubing from 0·5 to 8·0 mm bore of wall thickness 1·6 mm. A speed control provides infinitely variable adjustment down to approx. 1/100 of the maximum speed of 200 rev/min. Direction of rotation is reversible. A polarised socket is provided for remote control of speed. The minimum flow rates are about $^1/_{50}$ of the approx. maximum figures given below.

Tube bore	0·6	1	1·5	2	3	4	6	8 mm
Flow, max.	10	20	40	80	180	290	490	650 ml/min

This pump is **not** suitable for use with multichannel accessories **WM-290 and WM-295.** For 200/250V 50 Hz single phase supplies. **Requires but does not include flexible tubing of 1·6 mm wall. TX-805 is recommended** ... ... Each **£99·50** *f*

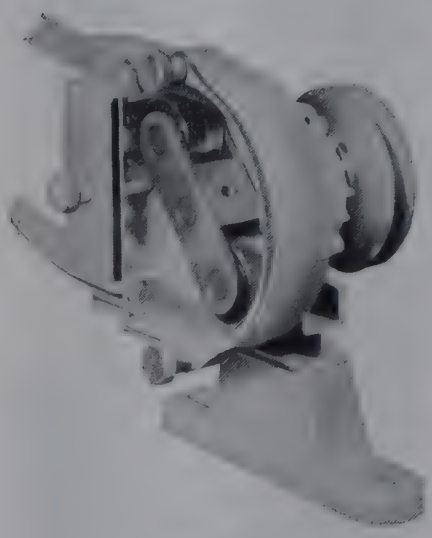
WM-260

PUMP, water and chemical, peristaltic metering, *Watson-Marlow* **Model MHRE/7.** As WM-250 but with maximum speed approx. 7 rev/min providing a range of approx. maximum flow rates as follows.

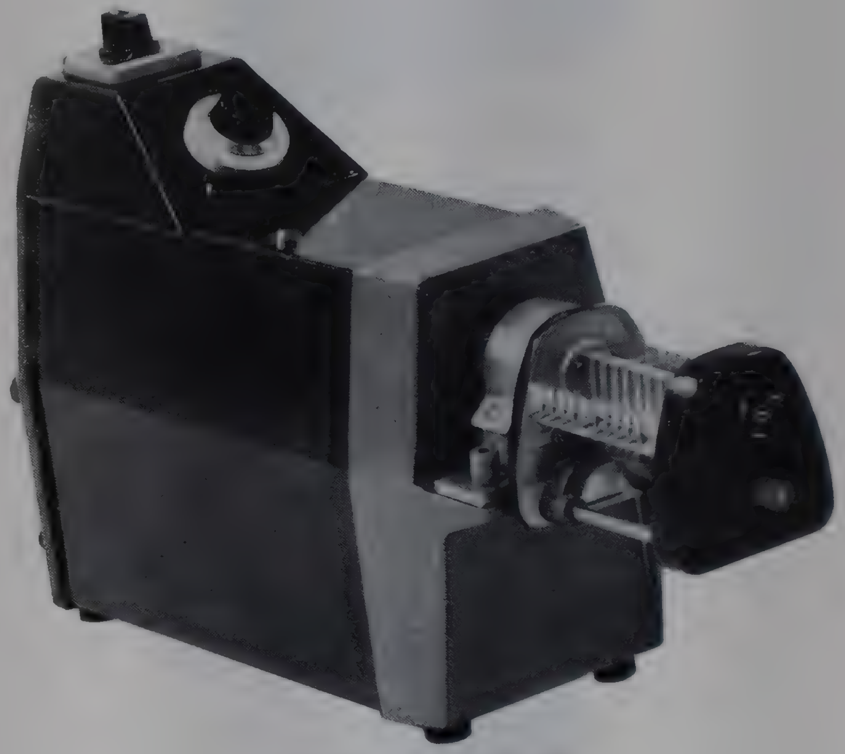
Tube bore	0·6	1	1·5	2	3	4	6	8 mm
Flow, max.	0·3	0·6	1·5	2·5	5·5	9	15·5	20 ml/min

This pump can be converted for multichannel operation by addition of accessories WM-290 and WM-295, up to a limit of 50 channels. For 200/250V 50 Hz single phase supplies. **Requires but does not include flexible tubing of 1·6 mm wall. TX-805 is recommended.**

Each **£115·00** *f*



WM-200



WM-260 with WM-290

ACCESSORIES

WM-290 **Multichannel delta conversion kit,** for use with pump WM-260. Comprising drive adapter, one module WM-295, end plate with priming knob and one set of 10 tube elements 1, 2, 2·5, 3, 4 or 5 mm bore. Unless otherwise specified when ordering, 1 mm will be supplied. Flow rates are approximate.

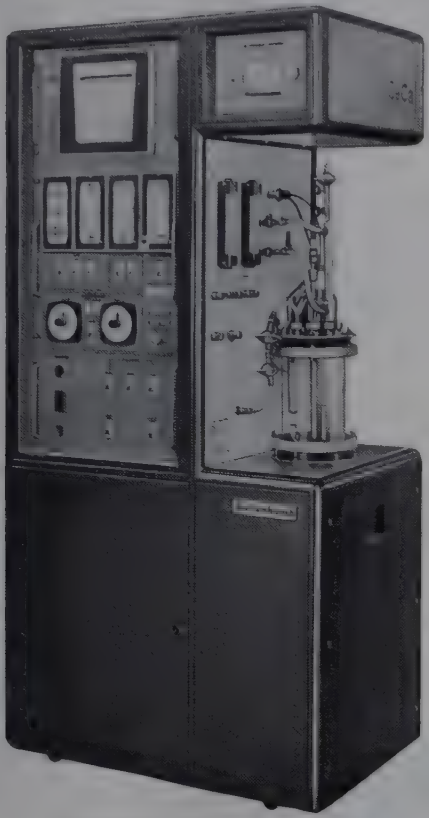
Tube bore	1	2	2·5	3	4	5 mm
Flow, max.	0·3	0·7	0·8	1	3·3	4 ml/min

Each **£38·00** *f*

WM-295 **Delta modules, 10 channel,** additional for use with above. These modules can be connected one to another on WM-290 before fitting the end plate. By this means pump WM-260 can be operated up to a limit of 5 modules i.e. 50 channels. Each module is supplied complete with one set of 10 tube elements, 1, 2, 2·5, 3, 4 or 5 mm bore, as specified when ordering ... ... Each **£20·00** *f*

TX-805 **Tubing, silicone rubber,** 1·6 mm wall, bores 0·6 to 8 mm. For details and prices see entry in List No. sequence.

Items on this page coded S normally available from stock.



CX-650 with accessories

Gallenkamp CeCa

CONTROLLED ENVIRONMENT CULTURE APPARATUS

A compact apparatus suitable for continuous and batch culture of micro organisms and studies of microbiological treatment of effluent and sewage.

- **Accurate auto control and strip chart record of dissolved oxygen, temperature and pH**
- **Accurately controlled adjustable speed high power stirrer**
- **Pumped weir to eliminate accretion of filamentous growths**
- **Integral trolley withdraws for autoclaving complete system *in toto***

For full details and prices see CX-650 et seq. in List No. sequence.

IH-270

Gallenkamp INCUBATORS

ANHYDRIC

A range of high quality incubators, for use in the fields of biology, microbiology, bacteriology and virology.

For full details and prices see IH-100 and IH-150 in List No. sequence.

COOLED

A range of refrigerated incubators with heaters for working at temperatures below, near to and above ambient temperature. Suitable for:

Micro organism culture studies

Biochemical oxygen demand (B.O.D.) testing

For full details and prices see IH-270 to IH-290 in List No. sequence.

SHAKING AND ORBITAL

A range of high quality incubators for growing cultures of micro organisms and tissue cells under controlled conditions of temperature and agitation.

For full details and prices see IH-350 et seq. in List No. sequence.

CX-300 with accessories

Gallenkamp COLONY COUNTER

With transistorised digital counter for counting bacterial and mould colonies.

- **Digital display of colony count**
- **Bright, dazzle free peripheral illumination**

For full details and prices see CX-300 in List No. sequence.

Other *Gallenkamp* apparatus for Water and Sewage Testing

CX-500	Anaerobic culture jar
CX-600	Loop flaming incinerator
FD-300 et seq.	Filter holders
FH-500	Flame analyser
OV-010 et seq.	Ovens
WF-360 et seq.	Water baths

For full details and prices see entries in List No. sequence.

DISSOLVED OXYGEN METER

Developed in co-operation with the Freshwater Biological Research Association, this is a simple robust meter for the direct determination of dissolved oxygen in river water, reservoirs, effluents etc. By means of a Mackereth lead-silver oxygen electrode within a polythene membrane, the instrument gives direct readings in percentage oxygen, relative to the value of a saturated solution of air in the water. The readings are temperature compensated by a resistance thermometer which is also used for measurement of temperature.

The instrument is completely portable being powered by five *Mallory* batteries which provide for 100 days continuous operation. Battery check is built in. Recorder outlet sockets are fitted for continuous simultaneous recording of oxygen concentration and temperature on any 1mA recorders of up to 400 ohms resistance.

	Oxygen	Temperature
Ranges	0–100 and 0–200%	−5 to 30°C
Accuracy	5% at f.s.d.	±1·5degC
Discrimination	0·5%	0·2degC

Dimensions: 22 × 19 × 31 cm
Weight: 5·4 kg.

WP-720

WP-720

DISSOLVED OXYGEN METER, *E.I.L.* **Model 15A,** as specification including probe containing electrode and resistance thermometer. With 5 batteries.
Each **£205·80** *fN*

REPLACEMENT PART

WP-722 **Batteries,** *Mallory* type RM42R. Set of 5 **£15·30** *fN*

WATER PURITY TESTER

A conductivity meter for determining the amounts of inorganic impurities dissolved in very pure water such as boiler feed water. For the control of water treatment, deionisation and distillation plant and measurement of water pollution.

A fully portable, direct reading instrument comprising a meter and a conductivity cell. The hand driven generator incorporated in the meter develops an a.c. output to render polarisation negligible. Readings are independent of the speed at which the handle is turned.

The dual cell with stainless steel electrodes has cell constants of 1·0 and 100. Temperature compensation is automatic. Five ranges are provided from 0–10 μmho/cm³ to 0–10⁵ μmho/cm³ at 20°C. Net weight 2 kg.

WP-740

WP-740

WATER PURITY TESTER, *Dionic,* as specification, with carrying case ... ... Each **£87·00** *f*

SEDIMENTATION

WP-820

SEDIMENTATION CONE, Imhoff, for determining amount of solid matter in sewage. Capacity 1000 cm³ with lower end graduated to 40 cm³ ... Each **£4·15** *a*

ACCESSORY

WP-822 **Stand,** wooden, for two cones ... ... Each **£3·30** *b*

WP-820

Other apparatus for **Water and Sewage Testing:**

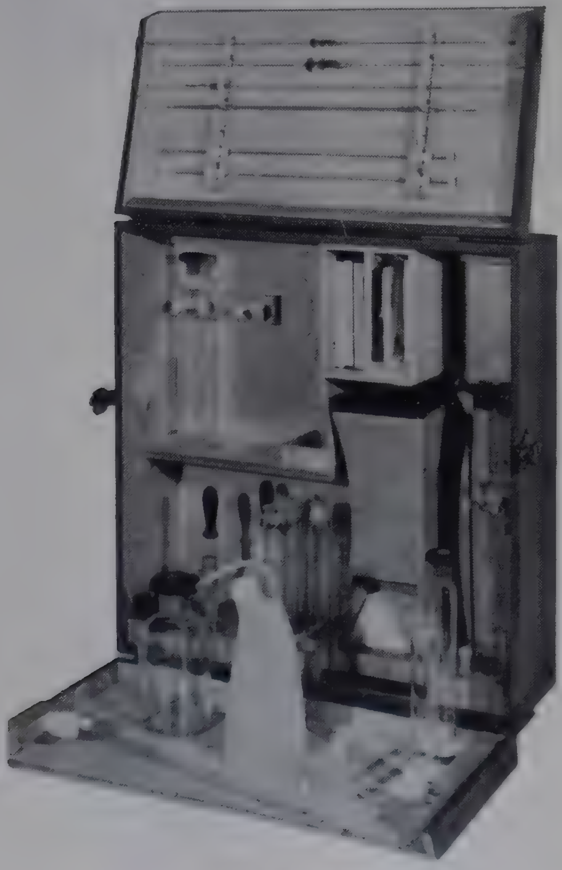
BT-100 et seq.	Bottles
CT-700 et seq.	Lovibond comparator and nessleriser
CX-200 et seq.	Culture bottles
CX-240 et seq.	Petri dishes
EJ-030 et seq.	Conductivity bridges
EJ-312 et seq.	pH meters
LB-120 et seq.	Labels
ML-050 et seq.	Microscopes
MP-710 et seq.	Graticules

Items on this page normally available from stock except those coded *N.*

Gallenkamp 'NALFLOC' WATER TESTING MINILABS

A comprehensive range of fully equipped Minilabs for investigating the chemical characteristics of feed, boiler and condensate water in land and marine installations. These tests are a necessary preliminary to the chemical processes involved in the *NALFLOC* System of Water Treatment and are based primarily on those published by the British Standards Institution in BS 1427 'Routine control methods of testing water used in industry' and BS 2690 'Methods of testing water used in industry.'

WR-230



WR-260

LAND MINILABS

Supplied in fitted hardwood working cabinets, with appropriate test methods but **without chemicals.** For necessary 'Chempacs' see page 813.

WR-220

WATER TESTING MINILAB, *NALFLOC*, **Model GA1,** for determination of hardness by Wanklyn soap solution, alkalinity and sulphate ... ... Each **£22·50** *f*

WR-222

WATER TESTING MINILAB, *NALFLOC*, **Model GA3,** for the determination of total, calcium and magnesium hardness by EDTA, alkalinity and sulphite. Each **£23·00** *f*

WR-230

WATER TESTING MINILAB, *NALFLOC*, **Model GA2,** for determination of hardness by Wanklyn soap solution, alkalinity, sulphate and phosphate ... Each **£30·00** *f*

WR-232

WATER TESTING MINILAB, *NALFLOC*, **Model GA4,** for the determination of total, calcium and magnesium hardness by EDTA, alkalinity, sulphite and phosphate. Each **£31·00** *f*

XTENSIONS FOR GA1, GA2, GA3 and GA4 MINILABS

WR-245 **Chloride set** for the determination of chloride. **Requires but does not include Chempac WR-515.** Each **£1·75** *f*

WR-247 **Hardness set** for the determination of total, calcium and magnesium hardness by EDTA. **Requires but does not include Chempac WR-520** ... Each **£1·85** *f*

WR-250 **Hydrometer set** for the determination of dissolved solids. With hydrometer calibrated at 60°F. Each **£11·25** *f*

WR-252 **Hydrometer set** as WR-250 but with hydrometer calibrated at 85°F for use in tropical climates. Each **£11·25** *f*

WR-255 **Phosphate set** for the determination of phosphate by the limit method. **Requires but does not include Chempac WR-530** ... ... Each **£8·00** *f*

WR-257 **Sulphate set** for the determination of sulphate in boiler water. **Requires but does not include Chempac WR-533** ... ... Each **£3·75** *f*

WR-260

WATER TESTING MINILAB, *NALFLOC*, **Model O_2Z,** for determination of oxygen in feed water, range 0 to 0·12 ml O_2/litre, by the indigo carmine method, and hydrazine in boiler water by the colorimetric method. Each **£58·00** *f*

WR-265

WATER TESTING MINILAB, *NALFLOC*, **Model P,** for the determination of phosphate by the comparator block method ... ... Each **£41·00** *f*

All items on this page normally available from stock.

Gallenkamp 'NALFLOC' WATER TESTING MINILABS

MARINE MINILABS

In fitted metal working cabinets finished in blue hammertone stoved enamel, suitable for wall or bench mounting. With appropriate test methods but **without chemicals.**

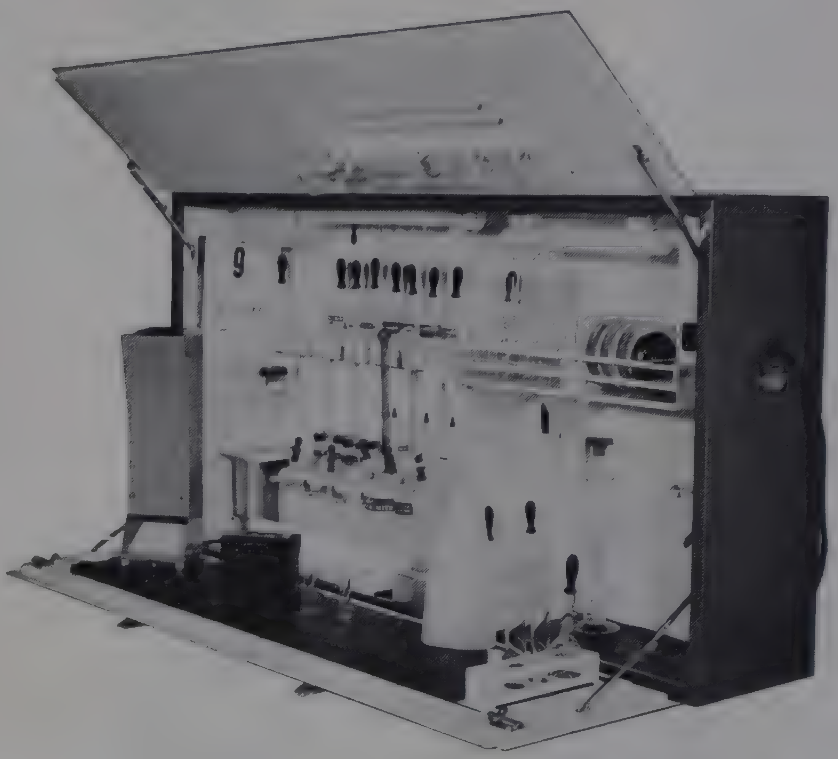
WR-400
WATER TESTING MINILAB, *NALFLOC*, **Model M,** for determination of hardness by Wanklyn soap solution, alkalinity and chloride ... ... Each **£45·75** f

WR-407
WATER TESTING MINILAB, *NALFLOC*, **Model MS,** for determination of hardness by Wanklyn soap solution, alkalinity, chloride and sulphite ... Each **£48·50** f

WR-415
WATER TESTING MINILAB, *NALFLOC*, **Model MPS,** for determination of hardness by Wanklyn soap solution, alkalinity, chloride, sulphite and phosphate. Each **£62·50** f

WR-480
WATER TESTING MINILAB, *NALFLOC*, **Model W,** a complete testing laboratory with striplight illumination, for determination of total, calcium and magnesium hardness; phenolphthalein, methyl orange and caustic alkalinity; pH; chloride, sulphite and phosphate; oxygen and hydrazine. For 110/120, 200/210, 220/230 or 240/250V a.c. supplies ... ... Each **£232·00** f

When ordering please state voltage and frequency of supply.



WR-480

REPLACEMENTS FOR MARINE MINILABS
WR-500 Set of spares, comprising burettes and expendable components in a carton ... ... Each £4·90 c

CHEMICALS FOR MINILABS

CHEMPACS

Each Minilab requires two or more 'Chempacs'. The Chempacs comprise sets of reagents for various tests as listed below and are packed in cases suitable for home and export delivery. Prices include cost of bottles and cases which are non-returnable.

WR-510	**Chempac basic reagent**	Each	**£4·30**	f
WR-515	**Chempac chloride reagent** ...	Each	**£2·90**	f
WR-520	**Chempac EDTA reagent** ...	Each	**£5·25**	f
WR-525	**Chempac oxygen zerox reagent.**	Each	**£4·00**	f
WR-530	**Chempac phosphate reagent** ...	Each	**£2·90**	f
WR-531	**Chempac reagent (acids pack)**...		**£3·50**	f
WR-533	**Chempac sulphate reagent** ...	Each	**£4·00**	f
WR-535	**Chempac sulphite reagent** ...	Each	**£3·10**	f

SETS OF CHEMPACS for MINILABS

List No.	For Minilab	Quantity of Chempacs required for each Minilab							Each Set	
		WR-510	WR-515	WR-520	WR-525	WR-530	WR-531	WR-535	£	
WR-550	GA1	1	–	–	–	–	–	1	7·40	f
WR-552	GA3	1	–	1	–	–	–	1	12·65	f
WR-560	GA2	1	–	–	–	1	–	1	10·30	f
WR-562	GA4	1	–	1	–	1	–	1	15·55	f
WR-570	O_2Z	–	–	–	2	–	–	–	8·00	f
WR-575	P	–	–	–		2	1	–	9·30	f
WR-580	M	2	2	–	–	–	–	–	14·40	f
WR-582	MS	2	2	–	–	–	–	2	20·60	f
WR-584	MPS	2	2	–	–	2	–	1	23·30	f
WR-586	W	2	2	1	2	2	–	1	36·55	f

FILTERPAC
WR-590
FILTERPAC, *NALFLOC*, containing 5 boxes of *Whatman* No. 1, 15 cm and one box of *Whatman* No. 6, 15 cm. Each £1·40 d

All items on this page normally available from stock.

COMPONENTS OF Gallenkamp 'NALFLOC' MINILABS

List No.		Each
WR-600	**Bottle, dispensing,** polythene, 125 ml, labelled	£
	METHYL ORANGE	0·15 *c*
	PHENOLPHTHALEIN	0·15 *c*
	POTASSIUM CHROMATE	0·15 *c*
	WETTING AGENT	0·15 *c*
WR-610	**Bottle, dropping,** polythene, 125 ml (rectangular shape)	0·30 *c*
WR-615	**Bottle, dropping,** polythene, 125 ml, labelled	
	ACID MOLYBDATE	0·40 *c*
	AMMONIA BUFFER	0·40 *c*
	CARBONATE/SULPHITE	0·40 *c*
	0·5N HYDROCHLORIC ACID	0·40 *c*
	HYDROQUINONE	0·40 *c*
	POTASSIUM HYDROXIDE 26·87% w/w K_2O	0·40 *c*
	SULPHATE BUFFER SOLUTION	0·40 *c*
	6·5% SULPHURIC ACID	0·40 *c*
	THYMOL BLUE	0·40 *c*
WR-616	**Bottle, dropping,** polythene, 125 ml, unlabelled	0·35 *c*
WR-670	**Bottle, reagent,** glass, 30 ml, with pipette	0·40 *c*
WR-690	**Bottle, wide mouth,** polythene, 60 ml, labelled	
	BARIUM CHLORIDE—POISON	0·15 *c*
	CALCIUM HARDNESS INDICATOR	0·15 *c*
	HYDROQUINONE TABLETS	0·15 *c*
	IODINE INDICATOR	0·15 *c*
	SODIUM DIETHYL DITHIOCARBAMATE	0·15 *c*
	SODIUM PERSULPHATE	0·15 *c*
	TOTAL HARDNESS INDICATOR	0·15 *c*
WR-710	**Buds,** cotton, pkt.	0·15 *c*
WR-750	**Burette, automatic,** with labelled polythene reservoir	
	0·04N BARIUM CHLORIDE	1·40 *c*
	0·02N EDTA SOLUTION	1·40 *c*
	POTASSIUM IODATE/IODIDE	1·40 *c*
	0·02N SILVER NITRATE	1·65 *c*
	0·02N SULPHURIC ACID	1·40 *c*
	WANKLYN SOAP SOLUTION	1·40 *c*
WR-751	**Burette** only, amber, for WR-750 silver nitrate	1·25 *a*
WR-790	**Comparator block,** *Lovibond*, for phosphate limit test	3·30 *m*
WR-840	**Filter unit, complete**	1·45 *c*
WR-880	**Hydrometer,** 60°F	8·00 *c*
WR-885	**Hydrometer,** tropical, 85°F	8·00 *c*

List No.		Ten	Each
		£	£
WR-948	**Pipette,** bulb, 10 cm^3	3·40	0·40 *a*
WR-950	**Pipette,** dropping, 2 cm^3	2·50	0·31 *a*
WR-951	**Pipette,** graduated, 5 cm^3	5·70	0·64 *a*
WR-952	**Pipette,** graduated, 10 cm^3, fast	4·60	0·51 *a*
WR-980	**Stirring rod,** polythene, 150×8 mm	2·50	0·31 *c*
WR-981	**Stirring rod,** glass, 150×6 mm	1·40	0·21 *c*
WR-982	**Stirring rod,** glass, 300×8 mm	1·40	0·21 *c*
WR-990	**Test tube,** polypropylene, 15 ml	1·40	0·21 *m*

List No.		
BH-345	**Basin,** polypropylene, 200 ml capacity	For details and prices see entries in List No. sequence.
	,, ,, 700 ml ,,	
BT-140	**Bottle, reagent,** glass, 250 ml	
BW-544	**Burette,** 10 cm^3, for WR-750 except silver nitrate	
BW-055	**Burette pinchcocks,** for WR-750 and BW-544	
CT-840	**Nessleriser,** *Lovibond*	
CT-844	**Nessler cylinder,** 50 cm^3	
CT-850	**Nessler disk,** NLF, pH	
CT-858	**Nessler disk,** NOE, O_2 in H_2O	
CT-859	**Nessler disk,** NOH, hydrazine in H_2O	
CT-846	**Nessler cylinder,** modified	
CT-826	**Comparator disk,** 3/12	
CT-700	**Comparator,** *Lovibond*	
CT-716	**Cells,** 13·5 mm	
CY-244	**Cylinder,** glass, graduated 10 cm^3 with plastics stopper	
	,, ,, ,, 50 cm^3 ,, ,,	
	,, ,, ,, 100 cm^3 ,, ,,	
CY-362	**Cylinder,** acrylic, graduated 10 cm^3	
	,, ,, ,, 25 cm^3	
	,, ,, ,, 50 cm^3	
	,, ,, ,, 100 cm^3	
FC-530	**Ashless tablets,** *Whatman*	
FP-322	**Funnel,** polypropylene, 9 cm	
HT-520	**Hydrometer jar,** polythene	
PM-104	**Pipette,** bulb, 5 cm^3	
PM-344	**Pipette,** graduated, 1 cm^3	
	,, ,, 2 cm^3	
	,, ,, 10 cm^3	
RV-220	**Rubber teat,** capacity 2·5 ml	
TJ-102	**Thermometer,** GP105C/0·5/100	
TJ-106	,, GP220F/100	
WB-100	**Washbottle,** 250 ml	
	Washbottle, 600 ml	

All items on this page normally available from stock.

WT-020

WEIGHING BOTTLES, glass, (AG), with ground-in hollow blown stopper.

Height	40	50	60	80	100 mm	
Diameter	20	25	30	40	50 mm	
Ten	£1·90	2·30	2·60	3·90	6·80	*a*
Each	£0·25	0·29	0·32	0·44	0·76	

WT-040

WEIGHING BOTTLES, glass, (AG), squat shape, with ground-in hollow blown stopper.

Height	30	30	30 mm	
Diameter	40	50	60 mm	
Ten	£5·00	6·00	8·20	*a*
Each	£0·55	0·66	0·92	

WT-050

WEIGHING BOTTLES, glass, (AG), with flat cap, ground on outside of bottle below the rim.

Height	50	60	70 mm	
Diameter	25	30	40 mm	
Ten	£2·20	3·30	4·30	*a*
Each	£0·28	0·39	0·48	

WT-065

WEIGHING BOTTLES, strong lightweight polycarbonate with close fitting lid. Can be used in drying ovens up to 110°C.

Height	25	50 mm	
Diameter	40	40 mm	
Ten	£1·50	1·70	*f*
Each	£0·22	0·24	

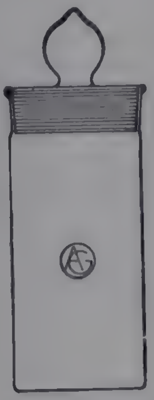
WT-070

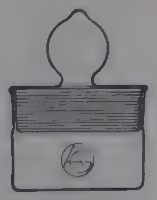
WEIGHING BOTTLE, lightweight polythene, translucent, with close fitting push-on lid. 50 mm height × 25 mm dia. ... ... Ten £0·60 Each £0·14 *f*

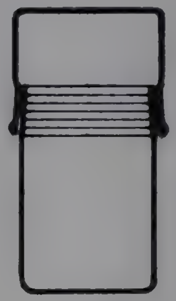
WT-150

WEIGHING SCOOPS, glass, (AG).

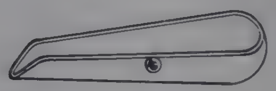
Length	65	80 mm	
Ten	£4·60	5·20	*a*
Each	£0·51	0·57	


WT-020


WT-040


WT-050

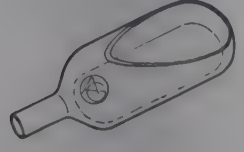
WT-065


WT-150

GLASS TUBES with snap-on polythene closures suitable for use as weighing bottles or tubes see specimen tubes TW-630 in List No. sequence.

WEIGHING BOTTLES, *Quickfit*	see QUICKFIT APPARATUS
WEIGHTS, analytical	see BALANCE WEIGHTS
WIRE, electrical	see ELECTRICAL APPARATUS
„ , gauzes	see GAUZES
„ , platinum	see PLATINUM
WOOL, cotton	see CULTURE APPARATUS
„ , glass	see GLASS SUNDRIES

All items on this page normally available from stock.

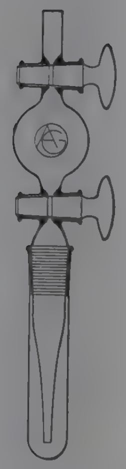


WT-170

WT-170

WEIGHING FUNNELS, glass, (AG), for preparation of standard solutions for volumetric analysis. The solid material is weighed in the funnel and then transferred to a volumetric flask by inserting the spout end into the neck of the flask and washing down with solvent from a washbottle. Combines the functions of weighing boat and funnel with improved convenience and accuracy.

Overall length, approx.	65	95 mm	
Body length, approx.	45	65 mm	
Body diameter, approx.	20	30 mm	
Ten	**£3·10**	**4·00**	a
Each	**£0·37**	**0·45**	



WT-190

WT-190

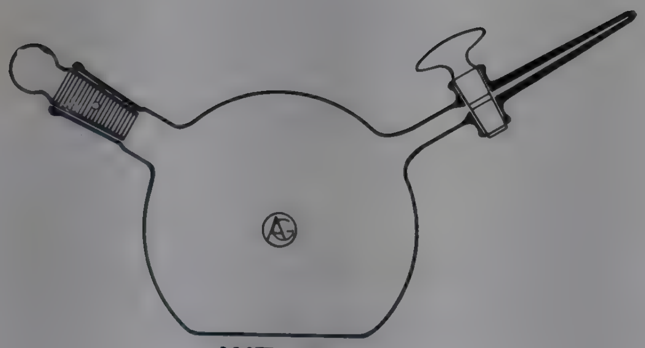
WEIGHING PIPETTE, Lunge-Rey, (AG), to BS 2058, for weighing corrosive acids, with reservoir and two straight bore stopcocks, capacity approx. 5 ml.

Ten **£23·50** Each **£2·60** a

WT-200

WEIGHT BURETTE, borosilicate glass, (AG), capacity approx. 120 ml, for gravimetric titrations, as designed by H. N. Redman, Imperial Chemical Industries Limited, Billingham Division and described in Analyst 1963 Vol. 88 p. 654. Comprises a flat-bottomed container with a filling neck and stopper drilled for admission of air, and a discharge jet and stopcock. The burette weighs approx. 70 g. When being weighed before and after titration the weight burette sits firmly on the balance pan on its flat bottom and loss of contents by evaporation is eliminated by the stopper and stopcock. During titration the burette can be supported by a retort ring with the jet pointing vertically downwards as with a volumetric burette.

Ten **£35·00** Each **£3·90** a



WT-200

WT-220

LEAD SHOT, for weighing and counterpoising, mixed sizes of nominal diameters 0·5 to 2·5 mm. In pack containing approximately 0·5 kg.

10 packs **£7·40** Pack **£0·82** c

ADDENDA

AND CORRIGENDA

The following pages include items too late for insertion in alphabetical position in the catalogue, together with corrections which have become necessary during the course of printing.

All items on this page normally available from stock.

ADDENDA

BA-983 (page 45).
WORKING COVER. Amendment. For 'BA-890' read 'BA-980'.

BALANCES. Price corrections.

List No.	Page	Each
		£
BB-640	46	197·00
BB-645	46	237·00
BC-080	48	80·00
BD-624	54	23·00

BC-510 (page 51).
BALANCES. For size '20 kg × 50 g' read '25 kg × 100 g'.

BC-572 (page 52).
BALANCE. 20 lb size subdivisions. For '0·25 lb' read '0·5 lb'.

BEAKERS (page 62).
BJ-620 and BJ-650. Cancelled.

BT-345 (page 75).
BOTTLE CAPS. Delete 'white'.

BR-180 (page 68).
BLOWPIPE. Price correction ... Each **£36·00**

BURETTES. Price corrections.

	Capacity	10	25	50 cm³
BW-088 (page 88).	Each	**£13·10**	**13·10**	**12·50**
BW-138 (page 89).	Each	**£13·25**	**13·25**	**12·95**

BURETTES (page 90). Price corrections.
BW-184 ... ... 12 **£12·20** Each **£1·14**
BW-187 ... ... 12 **£2·40** Each **£0·29**

	Capacity	25	50 cm³
BW-284	Dozen	**£25·50**	**29·00**
	Each	**£ 2·40**	**2·70**
BW-294	Dozen	**£35·00**	**36·00**
	Each	**£ 3·30**	**3·40**

BW-786 (page 94).
BURETTE. Amendment. 12th line delete 'technolite'.

BW-880 (page 94).
BURETTE STAND. Amendment. 1st line delete 'heavy' and for 'technolite' read 'glazed'.

BURETTE STANDS (page 94). Delete 'SM-260'.

BURNERS. Price corrections.

List No.	Page	Ten	Each
		£	£
BX-020, 11 mm	95	4·10	0·46
BX-020, 13 mm	95	4·60	0·51
BX-040	96	12·20	1·35
BX-045, 18 mm	96	21·50	2·40
BX-045, 22 mm	96	25·00	2·75
BX-054	96	—	2·55
BX-060	96	—	3·14
BX-075	96	12·20	1·35
BX-077	96	5·00	0·55
BX-085	96	6·60	0·74
BX-095	96	—	5·00

CB-200 (page 104). Price correction.
BOMB ... ... Each **£90·00**

COLORIMETERS (page 144). Price corrections.
CS-320 ... ... Each **£66·00**
CS-330 ... ... Each **£237·80**
CS-338 ... ... Each **£6·70**

COLORIMETERS. Amendments.

CT-780 (page 147). Add. 'With legs to allow cabinet to be positioned at any convenient viewing angle.'

CT-782 (page 147). Withdrawn.

CT-880 (page 149). Cancelled.
Illustration. For caption 'CT-880' read 'CT-882'.

COLORIMETERS. Price corrections.

List No.	Page	Each
		£
CT-700	146	5·25
CT-710	146	5·00
CT-714	146	0·90
CT-716 13·5 mm	146	0·90 pair
25 mm	146	2·00 pair
40 mm	146	3·00 pair
CT-740	147	8·50
CT-780	147	15·00
CT-810	147	5·50
CT-812	147	5·50
CT-814	147	5·50
CT-816	147	5·50
CT-818	147	5·50
CT-821	147	5·50
CT-824	147	5·00
CT-826	147	5·00
CT-846	148	3·10
CT-850	148	5·50
CT-852	148	5·00
CT-854	148	5·00
CT-856	148	5·00
CT-858	148	5·00
CT-859	148	5·00
CT-882	149	375·00
CT-886 1 in	149	2·00
5½ in	149	4·00
6 in	149	4·00
CT-888 5 mm	149	2·20
10 mm	149	2·00
25 mm	149	2·00
40 mm	149	3·00

CULTURE APPARATUS. Price, pack qty. and specification corrections.

CX-200 14 ml (page 160). In pack of 288 ... Pack **£9·25**

CX-240 50 mm (page 161). For depth '18 mm' read '13 mm'.

	Pack qty.	40 packs	Pack
		£	£
CX-242 (page 161).	10	13·40	0·42
CX-244 (page 161).	10	13·40	0·42

CX-246 (page 161).
10 packs **£16·50** 5 packs **£8·60** Pack **£1·85**

CX-250 (page 161).
70 **£8·60** 10 **£1·35** Each **£0·21**

CX-400 (page 165) ... ... Pack of 72 **£2·15** *code m*

CX-465 (page 165). In pack of 50.
8 packs **£17·50** Pack **£2·40**

CULTURE APPARATUS (page 173). New Items.

Under '**Replacement Parts**'

CX-688 **Oxygen electrode sterilization assembly** comprising glass tube with stopper and gas filter at either end. Each **£15·00** *g*

Under '**Accessories**'

CX-786 **Charging bottle assembly** for refilling nutrient storage bottle with aseptic nutrient. Comprises 20 litre bottle fitted with stopper and clamp, inlet air filter, sampling point and glass connector for linking to storage bottle. Each **£26·00** *g*

CX-790 **Instructions manual,** supplied in two volumes. Additional copy ... ... Each **£3·00** *g*

DEIONISERS (page 182). Amendments and price correction.

DH-615. For 'five Elgacans' read 'four Elgacans'. Each **£45·50**

DH-618. Withdrawn.

EF-940 (page 218).

OSCILLOSCOPE. Cancelled.

pH METERS and ACCESSORIES. Price corrections.

List No.	Page	Each
		£
EJ-645	225	**68·00**
EJ-655	225	**199·00**
EJ-657	225	**10·00**
EJ-675	226	**149·00**
EJ-685	226	**89·00**
EJ-775	228	**70·00**
EJ-782	228	**40·00**

ACCESSORIES (page 234). Amendments.

For 'SM-635' read 'SM-636'.
For 'SM-560' read 'SM-488'.

EV-100 (page 235). Price corrections.

WATER BATH.	220/240V	Each	**£67·00**
	200/210V	Each	**£67·50**
	110/120V	Each	**£67·50**

ACCESSORIES (page 235). Amendment.
For 'SM-635' read 'SM-636'.

FILTER PAPERS (page 241). Price corrections.

FC-770	Pack	**£0·60**
FC-772	Pack	**£6·90**

FD-068

FILTER SHEETS. Delete 'with holes'.

FILTER HOLDERS (page 244).

FD-350 to **FD-361.** Cancelled and replaced by FD-300 to FD-328 as following specifications.

Gallenkamp MEMBRANE FILTER HOLDERS

with stainless steel bodies

A range of membrane holders which are easily assembled and efficient in use.

The membrane which rests on a sintered glass bed is clamped between silicone rubber gaskets by hand tightening a locking collar on the filter body. A sintered bronze bed is available as an accessory.

FD-300

FD-305

FD-310

All metal parts are of stainless steel and the locking collar, which does not come into contact with the filtering liquid, is of polypropylene. The components may be sterilised by autoclaving at 121°C (1·05 kgf/cm²) and the holder may be loosely assembled with the membrane in position during this process.

FD-300

FILTER HOLDER, *Gallenkamp*, as specification, for **gravity or vacuum filtration.** Accepts 47 mm dia. and 50 mm dia. membranes. With cylindrical funnel top having capacity marks at 50 and 100 ml. **Without membranes.** Ten **£64·00** Each **£7·20** *b*

FD-305

FILTER HOLDER, *Gallenkamp*, as specification, **for gravity or vacuum filtration.** Accepts 47 mm dia. and 50 mm dia. membranes. With conical funnel top, capacity approx. 500 ml. **Without membranes.** Each **£10·80** *b*

FD-310

FILTER HOLDER, *Gallenkamp*, as specification, **for pressure filtration.** Accepts 47 mm and 50 mm dia. membranes. With cylindrical top, capacity 100 ml, fitted with an 8 mm o.d. nozzle for pressure connection and a screw-on cap for filling and pressure release. **Without membranes** ... ... Each **£18·00** *b*

ACCESSORY AND REPLACEMENT PARTS FOR FD-300, FD-305 and FD-310

FD-314	Filter bed, sintered bronze	Each	£0·45	*b*
FD-316	Filter bed, sintered glass	Each	£0·45	*b*
FD-318	Gaskets, silicone rubber	Pair	£0·45	*b*
FD-324	Funnel top, cylindrical, capacity 100 ml, with locking collar	Each	£1·40	*b*
FD-326	Funnel top, conical, capacity 500 ml, with locking collar	Each	£7·00	*b*
FD-328	Funnel top, pressure, capacity 100 ml, with locking collar	Each	£12·25	*b*

CONVERSION OF FILTER HOLDERS

By selecting the appropriate funnel top as listed above a filter holder can be converted into either of the other models.

To convert	into	use
FD-300	**FD-305** **FD-310**	**FD-326** **FD-328**
FD-305	**FD-300** **FD-310**	**FD-324** **FD-328**
FD-310	**FD-300** **FD-305**	**FD-324** **FD-326**

FILTER MEMBRANES—see FD-415 on opposite page.

All items on this page normally available from stock.

FD-415

FILTER MEMBRANES, *Oxoid*, cellulose ester. 47 mm diameter disks, 120 µm thick and having fine porous structures which provide for fast filtration rates. Printed with a grid of approx. 3·1 mm squares. Supplied in boxes of 100 disks.

Pore dia., maximum	0·22	0·47	2·00 µm	
Box	£4·00	4·00	4·00	*f*

FJ-010 (page 254).
FLASKS. 4 litre capacity cancelled.

FJ-052 (page 255).
FLASKS. Cancelled.

HJ-180 (page 386).
WAX HEATER/DISPENSER. Withdrawn and replaced by HJ-145.

HJ-145

Gallenkamp WAX DISPENSER

HJ-145

WAX DISPENSER, *Gallenkamp*, for storing and dispensing molten wax. Comprises anodised aluminium tank 20·5 cm dia. × 16 cm deep (approximate capacity 4·5 litres) fitted with a lever operated dispensing tap, removable gauze filter, lid and 500W heater. Temperature is controlled by an hydraulic thermostat range 20° to 90°C with direct reading scale. A preset safety thermostat is incorporated. Neon lamps indicate operation of control and safety thermostats.

Overall dimensions 26 cm dia. × 32 cm high. For a.c. single phase supplies.

For 220/240V	Each	£45·00	*b*
For 200/210V	Each	£46·00	*bN*
For 110/120V	Each	£46·00	*bN*

When ordering please state voltage and frequency of supply.

HJ-190

Gallenkamp FLOATING-OUT BATH

HJ-190

FLOATING-OUT BATH, *Gallenkamp*, for preparing microscope slides after wax embedding and microtome slicing. An anodised aluminium bath 20 cm dia. × 6 cm deep, stained black to facilitate viewing of sections. The rim of the bath slopes gently towards the centre so that slides rested on the rim drain into the bath. Fitted with a 500W heater. Temperature is controlled by an hydraulic thermostat range 20° to 90°C with direct reading scale. A preset safety thermostat is incorporated. Neon lamps indicate operation of control and safety thermostats. Overall dimensions 32 cm dia. × 11 cm high. For a.c. single phase supplies.

For 220/240V	Each	£28·00	*b*
For 200/210V	Each	£29·00	*bN*
For 110/120V	Each	£29·00	*bN*

When ordering please state voltage and frequency of supply.

HYGROMETERS (page 399). Amendment.

HV-150 both sizes	Cancelled
HV-152	
HV-156 both sizes	

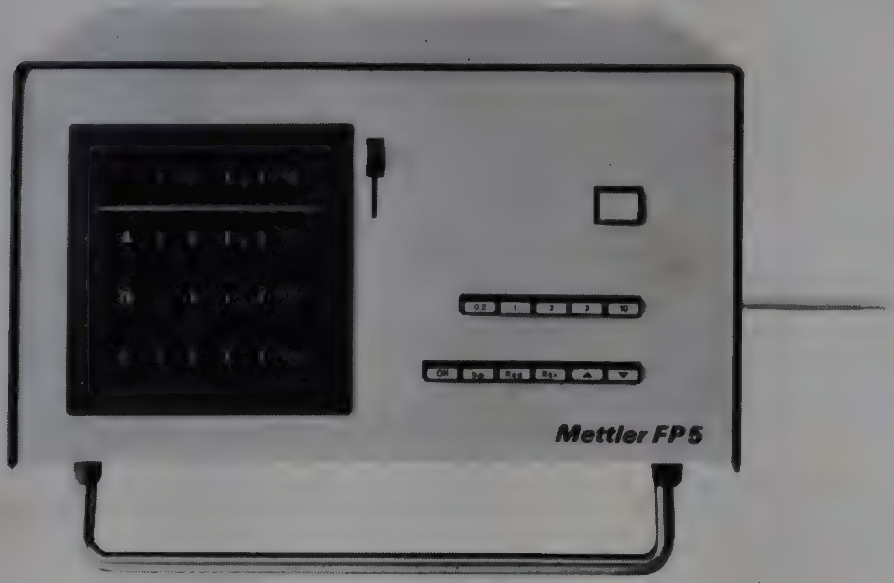
LH-600 (page 422).
VIEWING CABINET. Cancelled.

LK-102 (page 423).
LASER. Cancelled.

LX-225 (page 424). New item.
LUBRICANT, Apiezon grease AP 101, a general purpose stopcock grease. Softening point 185°C. Suitable for vacuum use down to 10^{-1} torr. In 2 oz (56g) tube.
Each £0·80 *f*

Items on this page normally available from stock except those coded *N*.

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS



MF-425

MODEL FP 5 CONTROLLER

For use with:

Melting and Boiling point accessory	**FP 51**
Microscope Hot Stage accessory	**FP 52**
Drop Point accessory	**FP 53**

- **Push buttons for five heating and cooling rates**
- **Push button on/off switch**
- **Push button recording for 1, 2 or all 3 channels with normal indications for any channel not being recorded.**
- **Push button boiling point operation**
- **Push button temperature reversal control for microscope hot stage**
- **Push button for fast up and down heating or cooling**
- **Results displayed digitally to 0·1degC**

The controller contains digital temperature indicators and push button controls for temperature programmes. Rapid initial heating and final cooling controls are provided. The linearity of the programme selected is strictly maintained by solid state electronic systems. The top window shows actual temperature; the lower three store and indicate digitally three independent results each to an accuracy of 0·1degC.

When the 'Ready' light indicates that the pre-selected temperature has been reached the operator inserts the sample, selects the heating rate and presses the start lever.

When used with the FP 51 and FP 53 the results are automatically displayed and the furnace is maintained isothermally at the last indicated temperature.

When used with the FP 51 and a recorder the temperature continues to rise until the maximum temperature is reached. The furnace is maintained isothermally at this temperature.

When used with the FP 52 the temperature continues to rise until three results are displayed or the maximum temperature is reached. The furnace is maintained isothermally at this temperature. If the reversal button is used the minimum temperatures is shown.

Technical Data

Temperature range	−20° to + 300°C
Heating and cooling rates degC/min	0·2, 1, 2, 3 and exploratory 10degC/min rate
Admissable voltage fluctuation	±10%
Recorder output	100mV into not less than 5 kΩ
Dimensions	36 × 38·5 × 21·5 cm high

***MF-425**

CONTROLLER, *Mettler* FP 5, as specification, with spares fuses and lamps. For 110, 125, 145, 160, 220 and 240V 50/60 Hz supplies ... ... Each **£450·00** *m*

All items on this page normally available from stock.

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS

MODEL FP51 AUTOMATIC MELTING AND BOILING POINT ACCESSORY

For the rapid, accurate and reliable determination of melting and boiling points and for recording (by means of a suitable recorder) of melting range.

- **Accurate temperature measurement by platinum resistance thermometer**
- **Simultaneous determination of melting point on three samples, with individual readout**
- **Boiling points measured on single samples of 50 to 80μl**
- **Up to 50 determinations an hour**
- **Rapid, automatic fan cooling at end of test**

Melting point determination
When the start lever has been depressed the instrument carries the determinations to completion with no further attention. The operator is required to do nothing more than read and record the individual results, each clearly displayed on the readout panel.

Performance and Technical Data

Heating rates, degC/minute	0·2; 1; 2; 3; 10
Precision	
Melting point at 0·2degC/minutes	0·1degC
Melting point at 1, 2 or 3degC/minute	0·5degC
Melting point at 10degC/minute	0·5degC
Boiling point at 0·2degC/minute	0·3degC

For operation below ambient temperature, down to −20°C the furnace unit must be operated in a refrigerated cabinet.

Dimensions: 16·2 cm dia. × 21·5 cm high.

***MF-435**
MELTING AND BOILING POINT APPARATUS, automatic, *Mettler* FP 51, as specification, including furnace unit, melting and boiling point tubes, boiling capillaries, tube carrier, tube diameter gauge and standard benzoic acid. **Requires but does not include MF-425 Controller** ... ... Each **£140·00** *m*

REPLACEMENT PARTS

***MF-440**	**Melting point tubes.**	In pack of 150...	Pack	**£1·10**	*a*
***MF-446**	**Boiling point tubes.**	In pack of 40 ...	Pack	**£0·75**	*a*
***MF-448**	**Boiling capillaries.**	In pack of 10 ...	Pack	**£1·25**	*a*

MODEL FP52 AUTOMATIC MICRO-MELTING POINT ACCESSORY

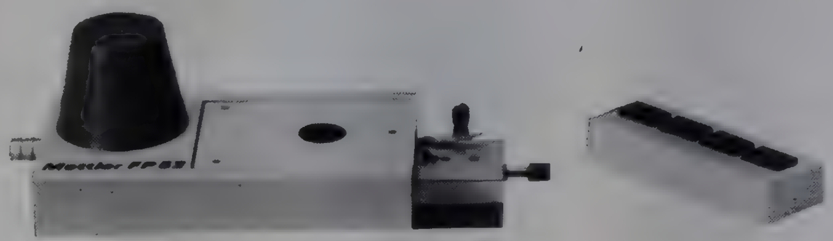
Permits thermomicroscopic investigations to be carried out without the operator's attention being distracted by the need to control the rate of rise of temperature, to read a thermometer or to write down results whilst observing the sample.

- **Determination of micro-melting points**
- **Determination of eutectic temperatures**
- **Investigation of polymorphous substances**
- **Thermal analyses by contact method**
- **Provides uniform temperature field pattern of the micro hot stage**

Hot Stage. This is constructed in two parts so that samples are heated simultaneously from above and below. It may be fitted to any standard microscope with a working distance of 29 mm. The heating plates incorporate a platinum resistance thermometer used for temperature measurement and a heat filter to protect the microscope objective. Built into the hot stage is a compact air blower which prevents the outer walls of the stage from becoming too hot and provides rapid cooling at the end of a test. A small nozzle is attached to the hot stage so that cold gases may be blown across the heating plates allowing determinations below ambient to be carried out at normal room temperature.

Mettler FP 51

MF-435



MF-455

Push button module. Each time the operator observes a change and wishes to record the temperature at which it occurred, he has merely to press one of the three buttons, labelled A, B and C, and the accurate temperature is indicated on the controller, ready to be noted at the end of the test. A fourth button is provided which arrests the temperature programme and allows isothermal observations to be made at any time.

Performance and Technical Data

Accuracy of hot stage temperature (on 0·2degC/min rate and isothermal)	±0·1degC between 30 and 100°C ±0·2degC between 100 and 200°C ±0·3degC between 200 and 300°C

Design Data and Dimensions

Sample recess (prismatic)	45 × 30 × 2 mm
Sample carrier (trimmed)	76 × 19 × 1 mm
Hot stage dimensions	19·5 × 8·5 × 4·8 cm high
Field of vision	2·5 mm diameter
Sample/objective clearance	7·0 mm
Stage/objective clearance	29 mm

***MF-455**
MICRO-MELTING POINT APPARATUS, automatic, *Mettler* FP 52, as specification, comprising hot stage and push button module. Includes two sets of 50 sample carriers and cover glasses, cooling vane, protective heat filter and replacement fan motor. **Requires but does not include MF-425 Controller** ... Each **£108·00** *m*

REPLACEMENT PARTS

***MF-466**	**Object stages,** 75 × 18 × 1 mm thick.	In pack of 100.	Pack	**£1·40**	*m*
***MF-468**	**Cover slips,** 15 × 15 × 0·2 mm thick.	In pack of 100.	Pack	**£0·70**	*m*

All items on this page normally available from stock.

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS

continued

MODEL FP53 AUTOMATIC DROP POINT ACCESSORY

For the rapid determination of the drop point of greases, fats and waxes.

Mettler FP53

MF-475

- **Drop points determined in accordance with methods described in ASTM D566—IP 132 DIN 51801 and BS 894 (Ubbelohde) using grease cup of standard dimensions**
- **Photoelectric detection ensures reproducible results**
- **Digital indication of drop point temperature**

Performance Data

Accuracy of hot stage temperature (on 0·2degC/min rate and isothermal)	±0·1degC between 30 and 100°C ±0·2degC between 100 and 200°C ±0·3degC between 200 and 300°C
Readability	0·1degC digital step

Technical Data and Dimensions

Sample quantity	0·4 to 0·6 g
Dimensions	16 cm dia. × 21·5 cm high

For operation below ambient temperature, down to −20°C the furnace unit must be operated in a refrigerated cabinet.

***MF-475**

DROP POINT APPARATUS, automatic, *Mettler* FP 53, as specification, comprising furnace, 7 grease cups, 2 grease cup holders, spatula and rod. **Requires but does not include MF-425 Controller.** Each **£130·00** *m*

REPLACEMENT PARTS

***MF-487**	Spares kit, comprising 2 grease cup holders, 2 grease cups, spatula and rod	Kit	£15·60	*m*
***MF-488**	Grease cup, set of 5	Set	£2·00	*m*

METTLER APPARATUS (pages 456 to 459).

MF-430, MF-460 and MF-480. Cancelled and replaced by *Mettler* FP 5 Assemblies MF-425, MF-435, MF-455 and MF-475: Specifications above and on pages 822/823.

MF-440, MF-446, MF-448, MF-466, MF-468, MF-487 and MF-488 *Mettler* accessories. Prices amended in specifications for FP 5 Assemblies.

MH-725 (page 466). Price correction.
POLISHING MACHINE ... ... Each **£243·00**

MH-860 (page 469). Price correction.
CABINET ... ... Each **£441·00**

MH-870 (page 469). Price correction.
CABINET ... ... Each **£565·00**

***PP-780** (page 608).
WELDING TORCH. Amendment 10th line delete 'two spanners'.

Gallenkamp LONG ARM STAND

ML-347

LONG ARM STAND, *Gallenkamp*, for use with *Olympus* microscopes ML-330 and ML-340. A heavy base, with two holes for storage of eyepieces, supports a vertical pillar which has a horizontal arm 12 cm long for holding the microscope. The arm rotates through 360° and can be clamped in any position. An adjustable locking collar prevents the arm from moving down the vertical pillar.

Overall height	33 cm
Base	25 cm wide × 30 cm deep
Weight	12 kg

Each **£15·00** *b*

ML-347 with microscope

RF-170 (page 661).
REFRACTOMETER. 2nd line. For 'wine' read 'urine'.

REFRIGERATED PROBES

- **Suitable for air or liquid cooling**
- **Flexible connection to cooling coil**
- **Available in three sizes**

Comprises a sealed compressor mounted in a ventilated stove enamelled case and coupled by flexible armoured hose to the evaporator coil. In use it is recommended that the refrigerated probe be left running continuously and that thermostatic control of the bath or air-space be effected by means of a heater and thermostat combination.

Technical Data

	RJ-450	**RJ-456**	**RJ-458**	
Overall dimensions (excluding flexible hose)	46 × 30 × 26	51 × 33 × 28	64 × 34 × 31	cm
Evaporator coils	18 × 18 × 2·5	21 × 21 × 6·5	21 × 21 × 6·5	cm
Type of coil	flat, vertical	triple helix	triple helix	
Weight	2	3	4·5	kg
Power consumption	210	260	400	W

RJ-450

REFRIGERATED PROBE ASSEMBLY, *T & M*, as specification, suitable for maintaining a 35 to 50 litre capacity thermostatted bath at **5 to 10degC below ambient.** For 220/240V 50 Hz single phase supplies.
Each **£98·25** *f*

RJ-456

REFRIGERATED PROBE ASSEMBLY, *T & M*, as specification, suitable for maintaining a 35 to 50 litre capacity thermostatted bath at **20 to 30degC below ambient.** For 220/240V 50 Hz single phase supplies.
Each **£133·00** *f*

RJ-458

REFRIGERATED PROBE ASSEMBLY, *T & M*, as specification, suitable for maintaining a 35 to 50 litre capacity thermostatted bath at **40 to 50degC below ambient.** For 220-240V 50 Hz single phase supplies.
Each **£167·50** *f*

RJ-456
RJ-458

TT-500 (page 757).
SPANNER. For length '150 cm' read '150 mm'.

TX-854 (page 766).
CONNECTORS. For 'nylon' read 'polypropylene'.

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